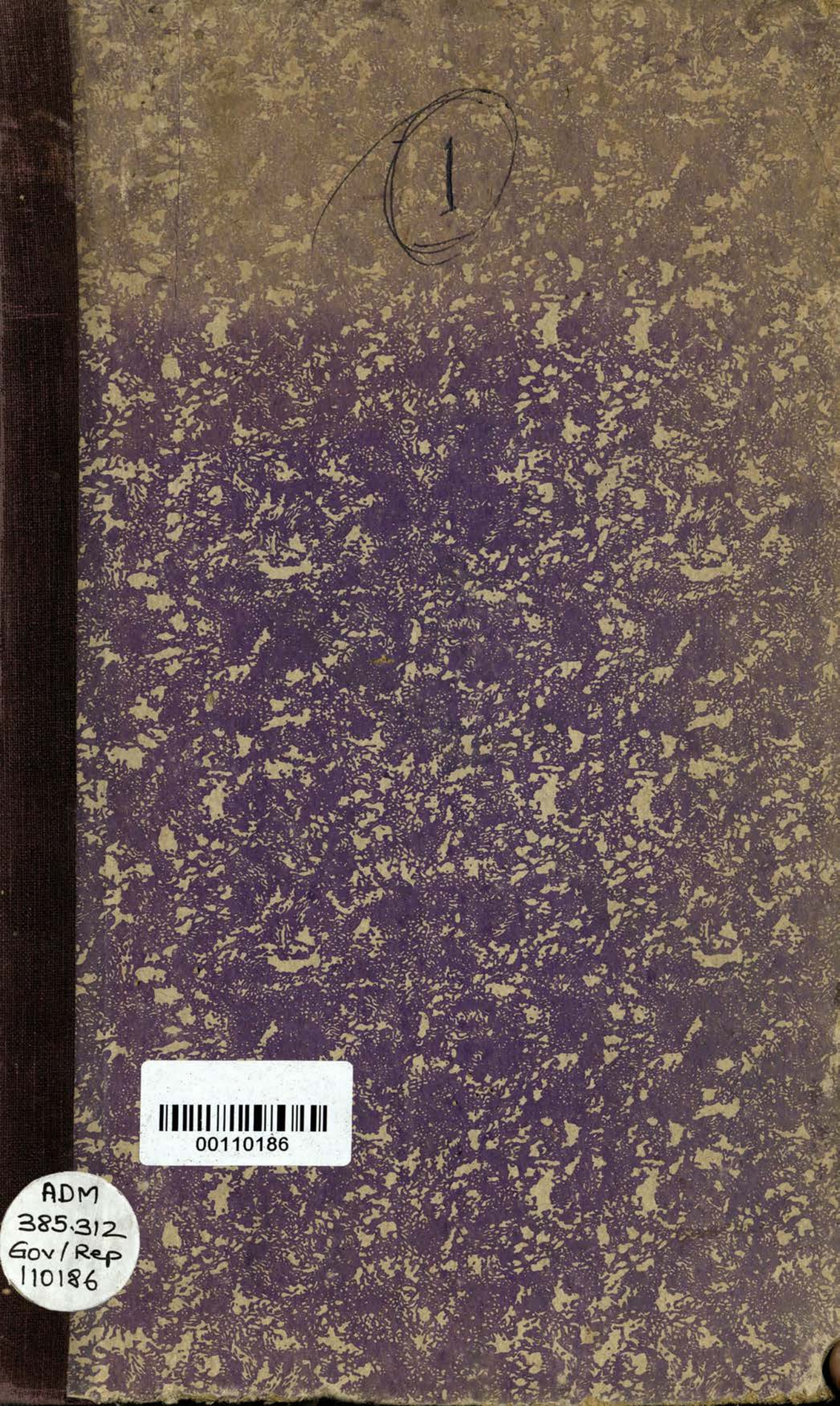
00110186

ADM
385.312
Gov/Rep
110186

00110186

Digitized with financial assistance from

H T Parekh FOUNDATION

An Initiative by HDFC

WITH YOU, RIGHT THROUGH

on 27 November, 2018

REPORT

OF THE

COMMITTEE

APPOINTED BY GOVERNMENT ON THE PROJECTED

KARWAR TO GADAK RAILWAY;

AND

EXTENSIONS AND ALTERNATIVE LINES.

WITH MAPS, EVIDENCE, ESTIMATES, AND RETURNS.

DECEMBER 1873.

Bombay:
PRINTED AT THE
GOVERNMENT CENTRAL PRESS.

1872.

INDEX.

PAGE.

MAPS.

REPORT ... ... (1)

APPENDIX I.

EVIDENCE—

Mr. LeMesurier 1
Mr. Forde 4
Captain Hewett, I. N. 9
Captain Parker, I. N. 12
Mr. C. J. Shaw 18
Major Greig 22
Mr. Forde, (re-examined) 27
Mr. LeMesurier, (re-examined) 27
Mr. Manuel 31
Mr. McIlwraith 33
Mr. Bickerdike 25
The Honourable Mr. Bythell 36

ROYAL ASIATIC SOCIETY LIBRARY

APPENDIX II.

Estimates of Cost of Construction ... ... 41—62
Correspondence as to Estimates of Rolling Stock ... ... 63—64
Correspondence as to Salt and Timber... ... ... 65—68
Salt Statistics ... ... 69—70
Customs Returns ... ... 72—79
Population Return 80
Return of Law under Cotton and Produce ... ... 81—82
Estimates of Working Expenses, (Mr. Forde) ... ... 83—85
Do. do. (Lieutenant Sargeaunt) ... ... 86—90
Comparative Statement of Expenses of other Indian Railways ... ... 92—93

To

THE SECRETARY TO GOVERNMENT,

RAILWAY DEPARTMENT.

SIR,

We, the undersigned, Members of the Committee appointed by Government Resolution in the Railway Department, No. 947, of 21st August 1872, to investigate the estimated returns on the proposed State Railway from Kárwár to Gadak, having regard to the line as an insolated railway, and taking into account possible extensions of it; and also to consider the question of the improvement of the port of Kárwár, and the amount of trade which may probably be transferred to that port from others in the neighbourhood,—have the honour to submit the accompanying evidence and documents, and to make the following report.

2. From later Government Resolutions in the Railway Department, Nos. 1151 and 1178 of 1872, as well as from communications subsequently received from Government, we have understood it to be the wish of Government that our inquiry, as relates to the projected railway from Kárwár to Gadak, should not be confined to the traffic estimates of that railway; but should be deemed as involving the scheme generally, together with the extensions and alternative railways proposed for the Southern Maratha Country, so far as we might be in a position to consider them.

3. Taking, first, the line from Kárwár to Gadak as an isolated railway, we beg to submit our opinion thereon under the following heads:—

I.—Probable cost of the line.
II.—Probable Traffic.
III.—Probable working expenses.

4. I.—*Probable cost of the line*:

The estimate of Mr. Shaw, the Chief Engineer of the Kárwár Railway Survey, for the High Level Ghaut Line, as last revised to accord with the views of Mr. Molesworth, Consulting Engineer to the Government of India, including 10 per cent. for superintendence, 15 per cent. for contingencies and maintenance for the first year, amounts to Rs.		72,88,350
Rolling-stock at Rs. 6,000 per mile	„	8,74,000
Total of Mr. Shaw's Estimate... Rs.		81,62,350

5. We recommend that the estimate be somewhat increased, and that it stand as under—

	Mr. Shaw's total, excluding Rolling-stock	Rs.	72,88,350
(*a*)	Addition to rates for Works	„	5,00,000
(*b*)	Addition for Stations, Sidings, &c	„	3,00,000
(*c*)	Addition to cost of Iron	„	3,00,000
(*d*)	Quarters for Staff	„	1,00,000
(*e*)	Proportion of cost of Surveys	„	3,00,000
(*f*)	Further allowance for Superintendence	„	50,000
(*g*)	Wharf at Kárwár	„	1,00,000
		Rs.	89,38,350
(*h*)	Rolling-stock at Rs. 8,000 per mile		11,60,000
		Rs.	1,00,98,350
		Say Rs.	1,01,00,000
(*i*)	Add for Compensation for Land and for Interest during construction, about	„	9,00,000
	Making the total	Rs.	1,10,00,000

6. Looking at the evidence of Major Greig, R.E., who was between two and three years Executive Engineer in Kanara, and at that of Mr. LeMesurier, at the rise of rates, which, from experience elsewhere, may be anticipated at the high ruling prices in the districts, and at the unfavourable conditions under which a great portion of the railway will be made, we deem it prudent to advise an addition, which we have calculated will amount to 5 lakhs, including contingencies, to Mr. Shaw's rates for work on the Ghaut District.

7. Mr. Shaw's estimate includes nothing for shops or machinery, very scanty station arrangements, and only $4\frac{1}{8}$ miles of siding to 145 miles of railway. While we concur that the outlay upon shops and station buildings may judiciously be limited, we deem that it would be economy to make some provision for repairing shops and machinery; to give more accommodation at the stations, and especially at the larger stations; and to allow about 15 miles, or 10 per cent., of sidings. The approximate addition under these heads, excluding wharfage conveniences at Kárwár, we would enter at 3 lakhs.

8. Mr. Shaw's estimate for iron work, including rails at £7 10s. a ton, appears to have been based upon the comparatively low prices of the English market in 1869. Existing high prices will probably not be maintained, but judging from the aspect of the iron trade, it would be wise to increase Mr. Shaw's prices by 25 per cent., which would involve an addition of about 3 lakhs to the estimate.

9. Mr. Shaw's estimate contains no provision for quarters for staff, which have to be given to a greater or less extent on every Indian Railway, and would be particularly necessary on parts of the country traversed by the Kárwár Line. For quarters we think 1 lakh should be entered, and the outlay under this head may possibly hereafter have to be increased.

10. We consider that the expenditure upon the surveys, including the proportion due to the Kárwár and Gadak Line of the outlay already incurred, should be shown in the estimate. We put it at 3 lakhs; and we think that the cost of the further surveys and exploration which we advise of the more difficult parts of the country traversed by the railway will be covered by savings on the works.

11. We think it advisable to add Rs. 50,000 to Mr. Shaw's allowance for superintendence, which has been calculated by him at 10 per cent. on his estimate of the cost of the works, excluding contingencies.

12. A wharf will, in our opinion, be required for the exclusive use of the railway at Kárwár for the landing of material and stores required for its construction. As an approximate estimate for this work, including siding and road to some convenient point on the Kárwár head-side of Beitcal Cove, we have allowed one lakh of rupees.

13. Mr. Shaw and Mr. Forde assign Rs. 8,74,000 for rolling-stock, or at the rate of Rs. 6,000 per mile. Mr. LeMesurier allows the larger sum of Rs. 13,00,000, or at the rate of Rs. 9,000 per mile. Mr. Molesworth has transmitted to us an approximate detailed estimate for rolling-stock which, we give in the Appendix, amounting to Rupees 10,00,000 or about Rs. 7,000 per mile; but we notice that he has entered the engines at Rs. 15,000 each, which we think too low for the class of engines which would be required. At this stage it only seems to us feasible to form a general idea of the rolling-stock, and there will be ample opportunity before the time arrives for ordering the rolling-stock, to gain more knowledge of the special and local wants of the line. Looking at the rolling-stock which has been found necessary on other Indian Railways, and the cost of it; at the general estimates which we have seen for other narrow gauge lines; at the circumstances and comparatively short length of the Kárwár Railway; and giving full weight to the consideration that it is desirable to be moderate in rolling-stock at the commencement,—we think it would be advisable to insert Rs. 11,60,000 for that item in the estimate, or at the rate of about Rs. 8,000 per mile.

14. The compensation for land would probably not be a large sum. Mr. Shaw has included about Rs. 15,000 in his estimate. We think Rs. 50,000 would be a nearer calculation. There is also the interest on capital during four years consumed in construction, which, with the addition for land compensation, would be little less than 9 lakhs, and this might even be exceeded if the construction occupied a longer time.

15. We notice that the railway is intended to be on the narrow or metre gauge, and, not conceiving that the gauge question is comprehended in the reference to us, we offer no opinion thereon.

16. Looking at the evidence before us, at the result of the surveys hitherto carried out, and at the report of Mr. Molesworth made after personally going over the route of the line, we deem further careful surveys and examination of the Ghaut and difficult districts advisable before the railway through these districts is finally located. We think the probable saving in construction, and the riper knowledge of the country which would thereby be acquired by the engineering staff, would fully justify the expense and trouble of additional surveys. We advocate these additional surveys as a prudent and economical step in furtherance of the work, and do not wish that they be deemed, should Government decide to construct the line, as furnishing a reason for delay in the commencement at Kárwár.

17. We have considered that the estimate was examined by Mr. Forde, by the Royal Engineer officers who advise the Bombay Government, and by Messrs. Molesworth and LeMesurier. We have accepted Mr. Shaw's quantities as essentially correct, and we have adopted his estimates with the additions made by us in this report. Provided, then, that the Engineering staff are guided by the extensive experience gained in past years in railway construction in India, and that competent contractors, with the best organization which that experience can suggest, be employed, we believe the railway from Kárwár to Gadak can be constructed and moderately equipped for about £1,100,000, including interest during the period of construction, being at the rate of £7,560 sterling per mile.

18. We, however, think it right to add that some unforeseen difficulties may possibly arise during the construction of the Kárwár Railway which cannot be fully provided for in any estimate. Among such difficulties, we recognize the unfavourable and unhealthy nature of the jungle and Ghaut country, the heavy rainfall on the Ghaut, the short duration of the working season, the uncertainty about labour and the rates for work, as conditions adverse to the economical and successful construction of a difficult railway, which would have to be encountered in a marked degree over about 60 miles of the Kárwár Line.

19. On the other hand, it is evident that the Kárwár Railway will receive the benefit of a saving in land carriage of materials by having its base of operations on the sea, and by its proximity throughout its entire length to a good cart road; and that it will enjoy the great advantage of an ample supply of timber of all kinds available in the forests of Kanara.

II.—*Probable Traffic.*

20. It is not easy to make a trustworthy estimate so long beforehand of the traffic of any Indian Railway, and particularly when a district not hitherto supplied with railway accommodation is opened out by a line starting from a new base about which opinions vary. We prefer to found our estimate on the existing trade of the country, rather than on the somewhat sanguine estimates of future traffic submitted to Government in 1869.

21. It is clear that the Kárwár Railway will have to depend largely for revenue upon the carriage of cotton from the Southern Maratha Country to the coast.

22. Considering the evidence, information, and returns before us, and assuming that, beyond the fluctuations arising from differences in seasons, no very material diminution occurs in the average annual export of cotton from the Dharwar and neighbouring districts within reach of the railway, the following, so far as we can judge, may be deemed an approximate estimate of the traffic which the Kárwár to Gadak Railway may be reasonably expected to obtain when in full work, within, say, 3 years after its completion :—

					Rs.
(*a*)	Cotton.....	20,000	Tons at Rs.	20	4,00,000
(*b*)	Salt.....	8,000	„ „	6½	52,000
(*c*)	Timber	12,000	„ „	5	60,000
(*d*)	Other Goods through and local say.....	20,000	„		1,75,000
	Total.....	60,000			
(*e*)	Passenger traffic at Rs. 2,000 per mile				2,90,000
	Miscellaneous				25,000
				Total.....Rs.	10,02,000

23. The average annual quantity of cotton produced in the Dharwar and adjacent districts, Dharwar Native States, Nizam's Territory, and Bellary, within reach of the Kárwár Railway, calculated from the figures based on the land under cotton cultivation contained in the statistics furnished by the Collectors and other authorities, and compiled by Colonel Anderson, one of our members, appears to be a little under 30,000 tons, and we have reason to believe that while there have been variations in different seasons, the average production has been generally maintained during the more recent years. The Customs returns of cotton exported from the ports on the coast in any particular financial or calendar year do not give a correct idea of the season's yield, as the time at which the crop is sent to market is irregular, and part of the crop finds its way to Bombay by other routes. The estimate of about 30,000 tons agrees generally with such particulars as we have been able to collect in Bombay of the average annual quantity of cotton sold as "Saw-ginned Dharwar" and "Coompta." Of this tonnage we have assumed in our traffic estimate that two-thirds, or 20,000 tons, will be sent by Railway to Kárwár. Taking this at Rupees 22-8 per ton, a rate corresponding somewhat to that charged for unpressed cotton over the G.I.P. and Madras Railways, it would yield a revenue of about 4½ lakhs. But if a proportion of the crop be pressed up-country, as we are told is likely to be done through European agency, lower rates, such as are conceded on other Indian Railways for full-pressed cotton, may be expected by the merchants for full-pressed cotton over the Kárwár Railway; and if they are granted, it it evident that the railway receipts from cotton may be reduced. If we assume that half the crop is full-pressed up-country, and carried at two-thirds of the rate for unpressed cotton, the revenue therefrom would be Rs. 2,25,000 for unpressed cotton, and Rs. 1,50,000 for full-pressed cotton, making a total of Rs. 3,75,000. Against this decrease may be set a moderate reduction of working cost, cotton being cheaper to carry by railway in full-pressed bales than unpressed, and the decrease may also, sooner or later, be counterbalanced by the development of other traffic; but, in considering the revenue of the line, it is important that it should not be overlooked. In our traffic estimate we have entered the revenue from cotton at 4 lakhs.

24. With respect to salt, a letter from the Acting Collector of Salt Revenue is appended, giving his calculation of the salt traffic which may accrue to the railway. Seeing the large percentage he has added for diminution of smuggling and increase of trade owing to the railway, and the comparatively small deduction for local consumption below the Ghaut, we have reduced his estimate from 10,000 tons to 8,000 tons of salt at Rs. 6-8 per ton, which we deem a fair rate. The Collector of Salt Revenue has also in his 5th para. calculated an additional 3,000 tons of salt traffic as likely to go to the railway in the event of importation of salt from the Goa territory being prohibited. That measure would presumably lead to a greater consumption of salt manufactured in Kanara, and would bring an addition to the salt traffic on the line; but as the measure is one entirely dependent on the views Government may adopt on a question involving many considerations of separate importance, we abstain from taking that part of the calculation into account.

25. The timber traffic, including firewood from the jungles to the districts above the Ghaut, bamboos for export, and logs, we estimate at 12,000 tons at Rs. 5 per ton, which we think reasonable. We annex a letter from the Deputy Conservator of Forests on the subject.

26. The other Goods Traffic, through and local, which the railway will command, is difficult to calculate; but, looking at all the circumstances and at the customs returns, and assuming that the railway will enjoy about the same proportion of the other trade, as we have considered it may of the cotton, we think 20,000 tons, yielding a revenue of Rupees 1,75,000, a fair estimate. This is exclusive of cotton, salt, and timber, the three principal items of Goods Traffic which may be expected. About the Grain Traffic there seems much uncertainty.

27. The country between Gadak and Hubli being rich and populous, the Passenger Traffic will be fair in the districts about the Ghaut, but on the rest of the line it will be light. We estimate it at an average of Rs. 2,000 per mile, the figure adopted by Colonel Trevor in 1869.

28. The foregoing traffic estimate for the Kárwár Railway shows a total revenue of about Rs. 6,900 per railway mile per annum, being slightly above that of the Madras Railway which earned Rs. 6,300 per mile in 1870 and Rs. 6,600 per mile in 1871, and considerably below the East Indian, Eastern Bengal, Great Indian Peninsula, and Bombay, Baroda and Central India Lines.

29. Bearing upon the traffic of the railway is the question of the amount of trade which, supposing the railway to be made, will probably be transferred to Kárwár from other ports in the neighbourhood. Taking the six ports of Ratnagiri, Vengurla, Kárwár, Ankola, Coompta, and Honore, extending over 250 miles of coast, of which mention is made in the papers before us, we think that no part of the trade from Ratnagiri, and but very little of that from Vengurla, is likely to be attracted to the railway. From Coompta, which has a large trade, and is only 35 miles distant from Kárwár, we are inclined to the view, that if the railway Goods Rates are judiciously arranged, a considerable but probably gradual transfer of trade to Kárwár may be certainly anticipated after the completion of the railway, notwithstanding the opposition of local interests. A quantity of cotton from the country, even north of the proposed line of rail, does not now come down by the Arbyle Ghaut, but by the separate, somewhat longer, and more southerly road, from Sirsi to Coompta. The advantage and cheapness of the railway, however, as compared with carting down the Ghaut, would be so manifest, that there can be little doubt most of the cotton would soon use the railway, and the bulk of the other export and import trade would probably follow the route of the cotton. The trade of Ankola is insignificant, and that of Honore is small, but a proportion of it may be expected to go to Kárwár.

III.—*Probable Working Expenses.*

30. Two detailed estimates of the cost of working the railway from Kárwár to Gadak are appended, one of which has been prepared by Mr. Forde, C.E., and the other by Lieutenant Sargeaunt, R.E., Government Examiner of Railway Accounts, to both of whom we handed the approximate estimate of traffic which we had drawn up. The working estimate of Mr. Forde amounts to 44 per cent., and that of Lieutenant Sargeaunt to 51¼ per cent. of the approximate revenue of about 10 lakhs. Both these working estimates have been calculated with evident care and trouble ; but in them, while much is well-founded, of course much is also assumed, and a variation of the hypothesis on which they are based would considerably affect them. The difficulty, to which we have alluded, in framing a reliable estimate of the amount of traffic which may be forthcoming over an Indian Railway which will take four years to make, exists also in computing beforehand the cost of working ; and on the latter question we prefer, on the whole, to refrain from details, on which there must be no little room for doubt, and to offer only a general expression of our opinion.

31. Mr. Currey, one of our members, considers that on the Kárwár to Gadak Line, an isolated railway starting from a new and undeveloped sea-port, encumbered with a steep Ghaut and severe ruling gradients elsewhere, with works expensive to maintain, traversing a district where wages are high, with but a moderate traffic unevenly distributed throughout the year, and with the comparatively short mileage of 145 miles over which to spread fixed charges, the working expenses, even with the advantages of low speed and cheap wood fuel, equal to coal at about Rs. 12 per ton, will be heavy in proportion to the receipts. The working expenses of all Indian Railways for 1871 were 53·48 per cent. of the receipts; those of the railways in the United Kingdom for the same year were 48·16 per cent. of the receipts. Future railways will no doubt benefit by the experience which is being gained in railway administration in India, and economy should result from that experience; but the circumstances of the short Kárwár Railway will cause its working cost to exceed the avarage of other lines in India; and it remains to be seen whether Government will practically be able to work State Railways cheaper than the Companies work Guaranteed Railways. Colonel Trevor in his Report of 1869, and Mr. LeMesurier in his evidence before us, put the working expenses generally at 66 per cent. of the receipts. Mr. Currey thinks it would not be prudent to estimate them at less than at 60 per cent. of the receipts, being 6 lakhs of the computed revenue of 10 lakhs.

32. Lieutenant-Colonel Hancock, another of our members, is of opinion that Lieutenant Sargeaunt's estimate is a fair general guide, and that the working expenses may be taken at about 55 per cent. of the gross receipts. He points out that the Madras Railway with gross receipts of £660 per open mile, and the Great Southern of India Railway with only £425 per open mile, both burning wood fuel, worked during 1871 at 51¼ and 55 per cent. respectively. He lays stress on the general concurrence of opinion of those best qualified to judge, that the working expenses on the Indian guaranteed lines are higher now then they will be in the future, and on the efforts that are being made to reduce them ; and considers it certain that greater economy will result, and that there is no reason to suppose that the State lines hereafter opened will not benefit by the experience which is being gained in the management of traffic. He points out that in certain items, such as Home charges and Indian agency and audit, the fact of there being a general establishment for the entire system of State Railways ought to result in moderate fixed charges, that the Kárwár Line, though it will labour under the disadvantage of a Ghaut and steep gradients, indifferent climate, a high rate of wages, and somewhat high charges for ordinary maintenance, will, from its situation, probably enjoy immunity from extraordinary casualties, from flood such as have swelled the maintenance charges on many other lines; while

the low rate of speed proposed—15 miles an hour being understood to be the maximum—should tend to lower charges for repairs due to wear and tear as well as for locomotive working.

On the whole, Lieutenant-Colonel Hancock is of opinion that if by the time the Kárwár Railway is carrying the traffic and earning the revenue estimated by the Committee, its working expenses exceed 55 per cent., the management will be greatly in fault, and that this percentage, which would give 5½ lakhs of the estimated revenue of 10 lakhs, may be adopted by the Committee with perfect safety.

33. A majority of the Committee concur with the opinion of Colonel Hancock as stated at the end of the preceding paragraph.

34. The figures adopted by a majority of our Committee would thus leave a net profit of 4½ lakhs, equal to 4·09 per cent. per annum on a capital expenditure for the railway of £1,100,000 sterling. Mr. Currey's figures would leave a profit of 4 lakhs, equal to 3·63 per cent. per annum on the same capital expenditure.

Port of Kárwár.

35. The harbour of Kárwár may be thus described. From 10° West of North, round by East and South to West, 280°, the harbour is formed and protected by land. From West 80° towards the North the harbour is open to the sea.

36. From North-West towards North, at a distance of 2⅔ miles from the anchorage, there are two islands, Deoghar and Cormaghar, which form a natural breakwater in that direction of about 1,000 yards in length.

37. The oyster islands, which are situated a few degrees North of West, are distant upwards of three miles from the anchorage. They lie end on towards the harbour, and afford little or no protection to the port.

38. From the low, sandy beach, which has a direction nearly North and South, a spur of the Kárwár hills runs out due West into the sea for a distance of about 3,800 yards, or 2¼ miles. The end of this spur, which has an extreme elevation of 640 feet above the sea and is detached, is called Kárwár Head. It has a breadth of about 1,500 yards, and is joined to the mainland by a low isthmus 500 yards in width. The sea thus intervenes between Kárwár Head and the mainland for nearly 1,000 yards, and this inland bay, which is shallow at its upper end, and has 15 or 16 feet of water at low tides at its mouth, is called Beitcul Cove.

39. Beitcul Cove affords complete protection to native craft, and small steamers can anchor at its mouth in perfect safety at all seasons of the year.

40. The port of Kárwár, where steam-ships and vessels of a larger size are moored, or lie at anchor, is outside Beitcul Cove. This port is well protected by Kárwár Head from West to South, and, therefore, is fairly sheltered from the South-West monsoon swell. But a vessel moored in the centre of the protected area marked on the chart by the port officer is exposed to the open sea from 3° South of West towards the North; and a ship anchored near the outer edge of this area would be exposed to the open sea from about 16° South of West.

41. The soundings in the protected area of the port of Kárwár give a depth of 22 feet at low water spring tides, and we are of opinion that probably a dozen vessels, drawing not more than 17 or 18 feet of water when laden, could be accommodated in the port at one time, and be fairly protected at all seasons. As regard vessels of a greater draft than the above, it will be seen from the evidence of Captains Hewett and Parker, that vessels drawing, say, from 20 to 22 feet of water could safely load in the port in fair weather, with smooth water; conditions not to be expected at the close of the busy season just previous to the setting in of the South-West monsoon.

42. On this subject we would offer an expression of our opinion from the nautical evidence, that a heavily laden ship, drawing upwards of 18 feet of water, could not prudently be detained at Kárwár in the present condition of the harbour as late as the first burst of the monsoon.

43. Bearing in mind the supersession of sailing vessels by steam-ships, which has received so great an impetus since the opening of the Suez Canal; the amount of trade which might be expected at Kárwár for some years to come, should the railway be made; that the trade will mostly flow to and from Bombay, and consequently the port of Kárwár is not likely to have for many years a large direct trade with Europe; that a steam-tug might be kept at Kárwár at the disposal of the port officer, which would afford assistance to shipping requiring to put to sea—we would not recommend the adoption of any large and expensive project for the further protection of this port. The port with a few minor improvements to be mentioned may be left as it is for the present. If the railway be made, and, after a while, the trade prove of sufficient importance to warrant an expenditure for enlarged accommodation for shipping visiting the port, it will then be time enough to determine the nature of the works to be undertaken.

44. We wish it, however, to be clearly understood that should Kárwár ever become the port, or base, of a system of railways, and its trade receive great development, it will undoubtedly be essential that harbour works of some magnitude be undertaken which would add to the limited sheltered accommodation at present available for shipping.

45. Should the Kárwár State Railway be decided upon, we recommend that the undermentioned minor works be carried out at Kárwár:—

(*a*) That the railway have its own pier for the landing of its material, which pier should, we think, be built on the Kárwár Head side of the Beitcul Cove;

(*b*) That the present pier be carried out further into the sea, and that the whole structure should be well protected from the concussion of cargo boats by fender piling;

(*c*) That the wharf be extended seawards, either by solid construction or by staging, south of the present pier to enable cargo boats and native craft to load and unload at the wharf in Beitcul Cove at all times of the tide;

(*d*) That the holding-ground at the anchorage at Kárwár being muddy and bad, a sufficient number of moorings be laid down in the port.

46. The probable cost of these works would be about three and half lakhs of rupees. The first item would be a charge against the Kárwár Railway, and its cost may be assumed, including sidings and cranes, at one lakh. The other improvements recommended would not form a charge against the railway.

47. We are of opinion, that the present quay and road at Kárwár should be retained for the use of the public, and that the ground between the present pier and the Executive Engineer's Storeyard should not be included in the railway premises, though it will be desirable to lay a siding on to the wharf, so that goods may be transferred direct from the railway wagons to the ships. With an increase of trade, much quay and storage room will be required between the railway and the pier, and the available space is not very extensive, and cannot be much increased, in consequence of the hills rising so abruptly from the sea.

Alternative Lines, Extensions, and Southern Mahratta Railway system.

48. Adverting, next, to the alternative lines and extensions which have been proposed for the Southern Maratha Country, the first question which offers itself for consideration is as to the relative advantages of the railway from Kárwár to Gadak, or of a railway from Diksal, or Sholápur, or some point on the G. I. P.

railway to Húbli or some central point in the Dharwar cotton field. This is the question which, with particular regard to its bearing on the trade of Bombay, was discussed by the Chamber of Commerce in July last.

49. The case for the Kárwár Railway is, briefly, that it would open up from the coast the rich, populous, and cotton-producing Dharwar districts, at present unprovided with railway accommodation, and connect them by the shortest route with what we may term a new port on the Western coast of India. That the substitution of a railway for a difficult Ghaut road would be a great boon to those wealthy and somewhat inaccessible districts, and particularly as regards the transport of cotton and salt, and the opening out of the Kanara forests, is obvious. It may also be remarked that the bulk of the trade of those districts has always hitherto flowed through different channels to and from the coast. But it sould be remembered that the chief market for the cotton is Bombay, and that most of the cotton would have to be conveyed 300 miles from Kárwár to Bombay by sea. Direct shipments from Kárwár to European ports would, we are informed, be occasional, as the option of the numerous steamers leaving Bombay for Europe would in practice be preferred. We learn that last season the direct shipments from Kárwár to Europe greatly exceeded those of any previous season.

50. The case for the alternative railway, which we will call the Deccan Line, is, that it opens up the districts south of the G. I. P. Railway and the Southern Maratha Country from the interior. The alternative lines which have been suggested, and which, so far as we can judge, appear suitable, are either from Sholápur to Hubli, now under survey, about 200 miles, or from Diksal to Húbli, about 240 miles. Either of these lines would connect the Dharwar districts with Bombay—the first by a route of about 482 miles of railway, of which 282 miles form part of the existing G. I. P. Railway; the second by a route of about 423 miles of railway, of which 183 miles form part of the existing G. I. P. Railway.

51. No regular survey or estimate of either of these Deccan Lines has yet been completed, and either would involve a considerable amount of bridging. In contrasting the schemes, however, we assume that the Deccan Line of 200 miles from Sholápur would cost less per mile than the Kárwár Line of 145 miles, and about 15 lakhs more total capital outlay than the Kárwár Line, that the Deccan Line of 240 miles from Diksal would also cost less per mile than the Kárwár Line of 145 miles, and about 40 lakhs more total capital outlay than the Kárwár Line.

52. Cotton from the Southern Maratha Country to Bombay would be conveyed cheaper by the Kárwár route than by the Deccan route, but the amount of the difference in carriage would depend on the mode in which the rates were arranged. Taking the rate over the Kárwár Railway which we have assumed in our traffic estimate, and a moderate sea freight, the cost by Kárwár would stand as under—

	Per ton.
Railway to Kárwár	20
Steamer to Bombay, including Insurance	17
Rs.....	37

The cost from Kárwár to Bombay by native boats might be lower, but the charge appears to vary with the season of the year and to be heaviest in the busy months, and the mode of transport is less certain.

53. If we apply the same mileage rate for cotton to the railways on both routes, the cost by the Deccan route is of course much higher, and the advantage by the Kárwár route considerable; but it is reasonable to suppose that the railway rates would be adjusted to meet competition or to suit circumstances, and it would be feasible to carry cotton by the Deccan Line and G. I. P. Railway at

a through rate only so much higher than the through cost by Kárwár, as fairly to represent the greater certainty and superiority of a through railway route of say 450 miles over a part railway, part sea route, of 410 miles. For example, a rate of 18 pies per ton per mile would amount to about Rs 42 per ton for 450 miles, which would compare with some of the rates actually charged for cotton on the G. I. P. and B. B. and C. I. Railways. For full-pressed cotton the balance of advantage would incline to the Deccan route, as full-pressed cotton can be carried by railway at a lower mileage rate than unpressed cotton. But for unpressed cotton, except, perhaps, during the monsoon, the balance of advantage would lie with the Kárwár route.

54. Against any moderate difference in favour of the Kárwár Railway and sea route in the cost of the conveyance of cotton to Bombay, should be set the greater certainty of the Deccan Railway route ; and, according to the expressed opinion of the merchants of Bombay, the latter seems to be more appreciated than the former.

55. Either of the Deccan Lines would cross a number of trade routes to and from the coast, would intercept much of the Vengurla trade, open out and connect with the Indian Railway system a greater extent of country, and, we are informed, serve a larger population than the isolated Kárwár Line. The celebrated Pandharpur Fair on the Bhima, near Sholápur, has three fairs annually, the attendance at each varying from fifty to seventy thousand persons, which would form an important feature in the passenger traffic of the alternative Deccan Line. The Deccan traffic, both in passengers and goods, would probably exceed, and be more likely to expand, than that of the isolated Kárwár Line ; but the Deccan mileage rates for cotton and certain descriptions of goods would be less, as the rates for such traffic would have to be concerted with the G. I. P. Railway Company on a low mileage scale for long distances.

56. The population on the coast and for some miles inland from Kárwár is large and thriving, with Gokurn, the site of a celebrated Jutra or fair, and Coompta some miles distant to the south. After leaving the more open country, which has good rice cultivation of the sweet and salt batty kinds, and a large manufacture of salt, the line approaches the Arbyle Ghaut, from the ascent of which, through Yellapur as far as Devikop on the Dharwar Frontier, there is a continuous forest, except for a limited area of rice and dry crop cultivation round the scattered villages. Yellapur is the chief town of a Talúka or civil sub-division of a Collectorate. It is not now a place of much trade, but would assume importance as a principal station in the proposed railway, especially as a central depôt for the export trade, timber and firewood, from the Kanára forests. Kulghutgee, Turras, and Missureekot—towns containing from two to four thousand inhabitants, with a trade in rice, spices, grain, and a little cotton—are near the line of proposed railway. Húbli, a town of about 40,000 inhabitants, is an emporium of the traffic of the surrounding districts in cotton-cloths, cotton, grain, and metals, especially copper. From Húbli to Gadak the line traverses the rich Dharwar cotton field. Other considerable towns on or near the line are—

	Inhabitants.
Kundgul (Jagheer)	8,000
Anigere	6,983
Mulgund	7,183
Gadak	10,320
Betigeree	8,716

Gadak, though in point of population far inferior to Hubli, is a principal mart for raw cotton, and a general trade is carried on at this place and at Betigeree, which adjoin each other, so as to constitute one municipal township. There are large Jutras or fairs within easy reach of the Kárwár to Gadak Line at Hoolgoor, Yemanur, Gudgudapur, and Betigeree, the annual attendance at which amounts to ten thousand, twenty thousand, ten thousand, and fifteen thousand persons, respectively.

57 The Carnatic Jutra of Yeluma near Soundutti, in the Belgaum Collectorate, about 30 miles from Dharwar, has an annual attendance little short of Pandharpur, or of from one hundred and fifty to two hundred thousand persons and would furnish passengers to both the Kárwár and Deccan Lines.

58. If it was proposed to make one railway only into the Southern Maratha Country, and if the practical alternative rested between a railway from Kárwár to Gadak, or a railway from Sholápur or Diksal on the G. I. P. Railway to Húbli or some point in the centre of the Dharwar cotton field, we are of opinion the latter or Deccan Line is the one which, as a commercial enterprise, would best answer for Government to undertake as an extension, if possible, of the guaranteed G. I. P. Railway, the receipts of which would be enhanced by the traffic therefrom. The chief reason against the Deccan Line is that adduced by Colonel Trevor in the latter portion of his Report of 29th September 1869 :— "That it would not be as beneficial to the cotton interest as a railway from the cotton districts to Kárwár." But on consideration of the two schemes, and after the full expression of mercantile opinion thereon, which has lately been given by the Chamber of Commerce in Bombay, it appears to us doubtful whether the Deccan Line, on account of its greater certainty as a means of transport of cotton to market, would not really serve the cotton trade as well as the isolated Kárwár Line, while in most other respects, so far as we can judge, the Deccan Line seems preferable to the isolated Kárwár Line.

59. We gather, however, from the papers before us, that the Government of India, entertaining a larger view of the question, intend to design, and eventually carry out, a regular system of railways in the Southern Maratha Country, starting from a fresh port on the western coast of India, and opening out a new railway route for trade and produce from, and to, the centre of the Indian Peninsula. There can be no question of the general public benefit which would result from the completion of such a railway system, which would of course connect Kárwár with both the G. I. P. and Madras Railways; and the intimation that such a scheme is contemplated by the Government of India, renders it less necessary to weigh the merits of different lines as alternatives, than to consider the order of priority in which Government might be advised to undertake those lines for which a sufficient case exists.

60. Accepting the larger view of the Government of India in favour of the development of a regular system of railways in the Southern Maratha Country, we recognize that there are advantages in beginning from the coast as the base of operations, and giving as a commencement railway communication between Kárwár and the cotton district above the Ghauts. But we submit that the first length of railway to be undertaken should be, not an isolated line from Kárwár to Gadak, but a line from Kárwár extending beyond Gadak to a junction with the Indian system at Bellary, on the Madras Railway, 90 miles directly east of Gadak.

61. No regular estimate has yet been made of the line from Gadak to Bellary, but Mr. Shaw in his evidence puts it generally at £4,000 to £4,500 per mile; adding rolling-stock, &c., the cost might be about £5,500 per mile, which for 90 miles would be £4,95,000, or, say, 50 lakhs. We are informed by Colonel Hancock, one of our members, who has been over the route of the line, that the works would be uniformly light with the exception of the bridge over the Toongbhudra river. The country from Gadak to the Toongbhudra, about 50 miles, is of the same general character as the Dharwar districts above the Ghaut traversed by the railway, and is well-cultivated. Between the Toongbhudra and Bellary, 40 miles, the country is not so good, and the cultivation is less—it suffers in most seasons from scarcity of water. Bellary is a military station, and the population, including the cantonment, amounted, according to the last census, to 51,145.

62. Adopting, as we do, the view of the Government of India, it seems to us to need little demonstration, looking at the geographical position, at the results to be anticipated from railways, and at the nature of the country to be provided with railway accommodation, that the first link of the Southern Maratha Railway system to be undertaken should be, not one affording a communication between the new port of Kárwár and the Dharwar districts only, but one forming a connection between Kárwár, the Dharwar districts, and the existing Indian Railway system. We think that a railway from Kárwár to Bellary, constructed and equipped for about £1,600,000, will enjoy a traffic more susceptible of expansion, and be likely in itself to be more profitable to Government, and much more beneficial to the trade and the people, than an isolated railway costing £1,100,000 from Kárwár to Gadak only, a gap of 90 miles being left between Gadak and Bellary.

63. The Southern Maratha Railway system will not of course be complete without extensions from some central point such as Húbli, northwards to the G. I. P. Railway, and southwards towards Mysore, and eventually to Bangalore. But the Kárwár to Bellary Line should be undertaken in the first instance, and the north and south extensions might be considered later. It may, however, be found advisable to carry out at an early period the first short section of the southern extension for 30 miles, from some point near Húbli to Bunkapur, which could, we are informed, be made at moderate cost, would serve a rich and populous district, and would enable the railway better to command the cotton and other traffic to, and from, the coast.

64. We acknowledge, as relates to the question of the continuance of the demand for Indian cotton raised with reference to the Kárwár Railway by his Grace the Secretary of State, in despatch to the Government of India No. 94 of 14th August 1872, that the commercial result of that railway must depend greatly upon the quantity of saleable cotton produced in the Southern Maratha Country and carried over the railway. We have deemed it expedient to examine on the subject of that cotton several of the leading merchants of Bombay representing the views held on both sides in the recent debate on the Kárwár Railway at the Chamber of Commerce, and we commend for the consideration of Government the evidence which those gentlemen have been so good as to give. The general cessation of demand for, and consequent diminution of, production of Indian cotton, beginning with the lower classes of the staple, resulting from increased quantities of better cotton from America, is a possible contingency no doubt to be feared; but it seems to us to be a matter of opinion, and it opens a wide general question, the full discussion of which is scarcely within the limits of this report. It is clear however, that the surest mode by which Indian cotton, and particularly such a cotton as the exotic saw-ginned Dharwar, can continue saleable at a remunerative price in the face of augmented supplies from other countries, is by permanent improvement in its cleaning and preparation; and the importance of this cannot be overrated.

65. The export of cotton from India to the United Kingdom may have fallen off in some years, since the American war, owing to the preference given by English spinners to superior cotton from America; but the demand for Indian cotton on the continent of Europe has largely increased, and the exports from India to the Mediterranean ports appear, according to the statistics published in the *Gazette of India* of 16th November 1872, to have advanced from £148,994 value in 1867-68 to £1,465,785 value in 1871-72. Of the last saw-ginned Dharwar cotton crop we are informed that about three-fourths was consumed on the continent, chiefly in Russia. So far as we can form an opinion on the position and prospects of Indian cotton, we think that India will preserve her cotton trade, and that, in considering any railways in the Southern Maratha Country, it may reasonably be assumed that the cotton production of that part of India will be maintained.

66. In para. 19 of the Secretary of State's despatch before-mentioned, the quantity of raw cotton exported from British India during each of the 6 years ending 1870-71 is quoted, and attention is drawn to the apparent decline in the exports which the figures exhibit. But, according to the official return published in the supplement to the *Gazette of India* of 16th November 1872, the export of raw cotton from British India during the year 1871-72 amounted to 809,246,087lbs. of the value of £21,272,430 sterling, the figures being nearly equal to those of 1865-66, and much higher than those of any intervening subsequent year. It is right, however, to add that these figures, which are for the financial year ending 31st March, do not give a correct indication of each season's crop, and should be accepted with reserve for purposes of comparison, as the periods at which the crop is ready in the districts and is exported are irregular, and vary in different years. For instance, the cotton crop of the season 1871-72 was unusually early in Western India, and a much larger proportion of it was shipped prior to the 31st March 1872, than was the case with the crop of 1870-71 prior to the 31st March 1871, or than will probably be the case with the crop of 1872-73 prior to the 31st March 1873.

67. Adverting to para. 33 of the despatch of the Secretary of State, calling for certain information relative to the districts which will be served by the line from Káwár to Gadak, a statement is appended showing the estimated area and population per square mile, and the extent of land in acres, of which about one-third is capable of cultivation with cotton annually by rotation.

68. The majority of the population, as almost throughout India, is agricultural, and 30 per cent. would be an outside estimate of the proportion employed in trade, manufacture, and other non-agricultural pursuits. As regards the portion included in the Bombay territory, comprising an area of about 7,110 square miles, the country is more thickly inhabited, the land more fertile, and the population less encumbered with debt, than in the Deccan districts further north. There are in the Carnatic very few Marwari money-lenders. The Guzars and other resident traders of foreign extraction meet a race who can compete on equal terms for the profits of commerce. The inhabitants of these southern cotton fields have a keen spirit for trade, and it is not an uncommon thing for a well-to-do cultivator to combine a certain amount of banking business with his other avocations.

69. The successful introduction over a large area of the foreign New Orleans cotton staple, while the experiment, though repeatedly made elsewhere, has invariably failed of permanent success, evinces a speciality of climate and some adaptability of the people for change of system, provided it offers a reasonable prospect of improvement and profit. In the case of the New Orleans staple, another operation is essential to give the interests concerned, both in England and India, the full benefit of the local efforts for production. It requires specially adapted saw-gin machinery, the inspection of which is undertaken by Government officers; and the opening of a railway would tend to induce dealers, and through them the growers, to co-operate with the Government Inspectors in placing the New Orleans staple in the market in a better condition than at present. In the Dharwar Collectorate the New Orleans cotton last year represented three-fifths of an area of upwards of half a million of acres under cotton.

70. It cannot, as far as we are informed, be alleged that there is any appearance of increase in manufactures, either for foreign export or for home consumption; but the comparative diminution in the number of native hand-looms indicates a result, which is confirmed by actual observation, that machine-made cloth is very generally displacing the native local manufacture, and that, by whatever route carried, an addition to this class of imports, termed piece goods, may be reasonably expected. The question of the direction in which a railway should be constructed, in order to secure the greatest facility for distribution of

general import trade, inclusive of piece goods, in the districts under review, is considered in another part of this report.

71. We have not overlooked the diminution in the imports of cotton goods from the United Kingdom into British India during the financial year ending 31st March 1872 (*Gazette* of 16th November); but, as far as we have means of judging, we regard this rather as a fluctuation in the course of trade than a symptom of decreased consumption in the country.

72. In connection with the question of railway communication with the Southern Maratha Country, it is proper to draw attention to certain advantages which the State would derive indirectly from its accomplishment. The possible enchancement of the land assessment has been brought forward in previous reports, and is estimated at about one and a half lakhs per annum, this being the augmentation immediately due to the construction of a railway. The opening out of the valuable Kanara Forests by the projected Kárwár Line would increase the revenue in the Forest Department. The connection by railway of the Dharwar District with the salt manufactures on the coast would tend to diminish smuggling and to increase consumption, while the construction of any railway would greatly facilitate any efforts which might be made to permanently improve the mode of preparation of the cotton, and consequently its market value.

73. We have abstained from any allusion to the manifest political and military advantages which would result from the introduction of railways into the Southern Maratha Country, and have treated the question on financial and commercial grounds only.

74. We now beg to summarize briefly the conclusions at which we have arrived in this report:—

1. That the railway from Kárwár to Gadak ought to be constructed and equipped for 110 lakhs, including interest during construction, or at the rate of £7,560 per mile.

2. That the traffic of the railway from Kárwár to Gadak may be expected to reach about 10 lakhs per annum within a reasonable period, say 3 years after the completion of the line.

3. That, taking the working expenses at 55 or 60 per cent. of the above receipts, there would be a net return of 4·09 or 3·63 per cent. on a capital outlay of 110 lakhs.

4. That no trade from Ratnagiri and very little from Vengurla is likely to be attracted to Kárwár, but that most of the trade from Coompta will be gradually transferred to Kárwár.

5. That no extensive works in Kárwár harbour need be undertaken at present; but that the immediate outlay should be confined to minor improvements, costing about 2½ lakhs, apart from railway expenditure.

6. That if the choice rested between two lines only—(1) from Kárwár to Gadak, or (2) from Diksal, Sholápur, or some point on the G. I. P. Railway to Húbli, or some point in the centre of the Dharwar cotton field—we should prefer the latter.

7. That we concur in the larger scheme of the Government of India for a system of railways in the Southern Mahratha Country, and as part of that scheme we should give precedence to the Kárwár Railway, which, however, we think should not be isolated, but should be undertaken in the first instance from Kárwár to connect with the Indian Railway system at Bellary.

8. That extensions northwards to the G. I. P. Railway, and southwards to Mysore, might remain for later consideration, except, perhaps, a short branch from Húbli to Bunkapur.

9. That we believe the production of cotton, on which any railways in the Southern Maratha Country will greatly depend for revenue, will be maintained.

10. That the general advantages of opening up the Southern Maratha Country and cotton fields by railways would be considerable, and merit the attention of Government.

75. Finally, we desire to express our acknowledgments for the assistance which in our inquiry has been rendered by the gentlemen who have given evidence before us, and by the officers and departments of Government who have furnished the information and returns for which we deemed it necessary to call.

We have the honour to be,
Sir
Your obedient Servants,

W. H. HAVELOCK,
Revenue Commissioner, S. D. } President.

W. C. ANDERSON, Colonel,
Survey and Settlement Commissioner.
S. M. C., Mysore and Dharwar.
H. ST.CLAIR WILKINS, Colonel, R.E.,
Acting Superintending Engineer, S.D.
H.F.HANCOCK, Lieutenant-Colonel, R.E.,
Acting Consulting Engineer for Railways.
C. CURREY,
Agent B. B. & C. I. Railway Company. } Members.

Bombay, 11*th January* 1873.

P.S.—Since the foregoing report was prepared we have received from Government a communication from the Madras Government to the Government of India, covering a memorandum from Mr. Strange on a proposed extension of the Madras Railway from Bellary to Gadak. We have expressed an opinion in favor of a Railway from Kárwár to Bellary, which practically meets the case.

W. H. HAVELOCK, President,
Revenue Commissioner, S.D.

Bombay, 11*th January* 1873.

MR. LEMESURIER *examined by the* COMMITTEE.

21st September 1872.

1. Do you consider the estimate of Rs. 72,88,350, as last revised by Mr. Shaw to meet Mr. Molesworth's views, for the Kárwár Railway, excluding rolling stock and preliminary expenses sufficient?

I do not.

2. Are you acquainted with the estimates of any other State Railways?

I have not studied any of them sufficiently to be able to speak from memory as to details now.

3. Do you consider 15 per cent. sufficient for contingencies for Kárwár?

It may be on the easier parts, but even this I question : it certainly will not be adequate on the more difficult parts.

4. Do you consider superintendence at 10 per cent. sufficiently estimated?

Ten per cent. would not be enough to supervise works, particularly over such a difficult country as is traversed by the Kárwár Railway.

5. Are you aware there is no local labour?

I have gathered that from the reports which have been laid before me.

6. Is it not the case that most Indian Railways on this side are not made with local labour?

It is to a great extent the case. The amount of imported labour must vary with the locality of the works.

7. Does not the pay of the labourer greatly affect the rates of work?

It does so necessarily—the capacity of the men being equal.

8. Do you consider the rates for labour in the Kárwár reports high or low, as compared with the G. I. P. rates?

I deem the existing rates for labour, both coolie labour and skilled labour, as quoted in all the documents to which I have had access, unusually high; but it is necessary to consider the modifications of existing labour rates caused by the commencement of large works, and the possible conditions of imported labour.

9. The last estimate of the period of construction was four seasons; in your opinion how could the construction be best divided yearly as regards the English and Indian cost?

To answer this question it will be necessary to consider on the whole programme, in consultation with those who have to look forward to carry out the work. And it is absolutely necessary that this should be arrived at with tolerable accuracy before the item of interest on out-lying capital can be computed and added to the estimate.

10. Prices have lately risen of iron, and iron work, in England. Can you give any opinion as to how long the present high prices may continue?

I incline to the opinion that the present very high prices may gradually somewhat abate, but I do not think that we shall ever again see prices at home so low as the average of the past few years.

11. Do you think 15 per cent. for contingencies is a sufficient margin on the English expenditure?

No, I do not.

12. You have stated that you are not acquainted with the estimates of any other State Railways. On what general grounds do you base your view that the Kárwár Railway estimates are insufficient?

Although I have not recently examined the detailed estimates, contract rates, &c., of any of the other State Railways at the time the tenders were under preparation, I considered the question of rates carefully, and was repeatedly consulted thereon. I have had ample opportunities myself of obtaining a fair knowledge of the prices at which work can be done under given conditions in India, and I deem the conditions as laid down, and the labour rates as quoted in the papers before me to be such as point to a higher cost per mile for the Kárwár line than for the Indore or Rájputána Railways.

13. Has not the Kárwár line certain compensating advantages, in the base of operations being on the sea coast; the existence of a made road alongside the Railway throughout its entire length; the plentiful supply of timber for sleepers and building purposes close at hand, and the absence of large rivers to be bridged?

Assuming that all the materials can be landed at Kárwár at a certain small excess of sea freights over what the same can be landed in Bombay, then of course the imported material should be put into place at a less price than on the other two Railways mentioned in my

former answer. The fact of there being a good road alongside the Railway from end to end is decidedly an advantage, which is also, to some extent, possessed by the Indore Railway; but in the case of the Rájputána Railway I am given to understand, that the country, generally, affords very few obstacles to carting during eight months in the year, and the cost of local carriage on that line will not, I think, be so high as I am led to suppose, from the rates quoted in the papers will obtain on the good road by the side of the Kárwár line. It certainly is an advantage to the Kárwár line to have a plentiful supply of timber, and that has been considered in the estimates; and the absence of large bridges, undoubtedly, reduces the quantities of work.

14. You have heard of the Kattiawár extension 78 miles in length, and that the carriage of the materials for that line *via* the B. B. & C. I. Railway from Bombay added Rs. 4,000 per mile to the cost; also that the line has actually cost Rs. 55,000 per mile: that it was partly laid with creosoted sleepers 7 to the rail and partly with pot-sleepers five to the rail, the cost (exclusive of carriage) being about Rs. 3½ each for creosoted, and about Rs. 6½ each for pots; also that the line is on the broad gauge, and laid with 60 lbs. rails, whereas the sleepers on the Kárwár Railway are estimated to cost Rs. 1-8 each, and the rails are 36 lbs. to the yard. Supposing that the Wadwán line had started from the sea, instead of Ahmadabad, as a base, and had been laid with lighter permanent way as above, what do you estimate the saving on the cost of construction would have been?

The cost of carriage over the B. B. & C. I. Railway would have been saved, also a third of the costs of the rails at the price of the day. An iron sleeper being used in each case, there would be a probable saving of at least a third on the cost of the sleepers at the price of the day, or in the case of wooden sleepers, assuming that the Kattiawár extension wooden sleepers were laid down at the near end of the line at Rs. 3½ each, and that the narrow gauge sleepers did only cost Rs. 1½ each, there would be a saving of Rs. 2 per sleeper: there would also be a proportionate saving on the plate-laying, and the total saving on the cost of construction would have been about Rs. 12,000 per mile.

15. What was the range of the contracts of cartage of material on the G. I. P. up country?

The bulk of their work was done before I joined the G. I P. at rates which I can furnish by reference, but which I have always considered and reported upon most strongly as exorbitant in the extreme. I know well for what carting of Railway materials can be done, if the arrangements are thoroughly good, and the ordinary rates for procurable carts are of a fair average character.

16. Is it to be understood, that the further you remove from the base of operations, and the wilder the country, with especial regard to the want of roads, the greater will be the cost of carriage, and the risk of loss of materials? I mean looking at the Kárwár Railway in comparison with the Indore and Rájputána Railways, and with the high rates for carriage which have been paid by the G. I. P. on their North-east extension.

Of course, I admit the principle contained in the first part of the question. I contend, however, that by well considered organization much of this difficulty can be satisfactorily dealt with anywhere. With regard to the G. I. P. carting beyond Khandwa, the greater portion of the distance to be traversed was either through jungle, or over heavy black soil. The arrangements were defective. Western India prices extended with the work from West to East, and time was deemed precious. Starting from the points at which the work of carting commenced, I do not think that the Rájputána line will be found in the end to have suffered more from loss by the way than the Indore or Kárwár lines, and I infer from the papers, that the cost of cart hire and the general difficulty in the matter of regular carriage is greater on the Kárwár than on either of the other two State lines.

23rd September 1872.

17. Do you wish to add anything to the opinion you have expressed, as to the allowance for supervision?

I wish to modify that opinion. Speaking, generally, from past experience, 10 per cent. would not cover cost of supervision. This is a subject to which I have always given special attention, and, since I gave my answer on the 21st, I have carefully estimated the probable cost of supervision on the Kárwár Railway, keeping in view the somewhat exceptional character of the country and climate; the duration of the work over four seasons; the possible addition to the estimated quantities of work; the comparatively small amount of masonry; provision for sickness; the employment of considerable European supervision in the subordinate grades and I have come to the conclusion, that Mr. Molesworth has made judicious and ample provision for the cost of his supervising staff, and with reasonable good fortune the allowance ought to suffice for everything in England, and India, but not for medical staff.

18. Since you have had the opportunity of looking through the detailed estimates, can you, with reference to question No. 12 put you on the 21st, specify the districts and particulars in which you deem the estimates insufficient?

I have looked through the revised estimates, and I am of opinion that the rates for the heaviest items have been based upon the wages now paid in each district for the small amount of labour required for local works, with a certain addition to provide for a rise in prices as the work advances. I am inclined to think that the prices generally are rather low as compared with what appears to be the existing current rate of wages, and I am decidedly of opinion that sufficient allowance has not been made for the very great increase which will almost certainly ensue. I think that experience generally in India does not point to the permanent lowering of the daily rate of wages by any importation of labour on a large scale, however carefully arranged, so long as the pressure of the work lasts.

19. Do the estimates which you have looked through bear evidence of having been carefully prepared?

I have not had the opportunity of inspecting the plans, and therefore I am unable to judge as to what margin, if any, in excess of the 15 per cent. for contingencies has been allowed for the heavy extra works which I am certain will be required, more particularly on the ghauts, before the line, as judging from the estimates and reports it is now designed, can be made ready for the working of regular traffic. The estimates, as they now stand, appear to me to provide for a very skeleton line. That the estimates so far as they go have been carefully considered, as regards quantities for the work provided to be done, is evident; but as I have said before, I should not be prepared to accept the prices quoted in all cases.

20. Will you particularize what you think the deficiencies in the estimates?

I find nothing entered for the cost of *preliminary operations* and *surveys*; nothing for *housing the staff, in the Engineer, Locomotive, or Traffic Departments*, although I would not recommend any large expenditure on permanent bungalows in the first instance, but comfortable and healthy quarters would nevertheless be indispensable. *Insufficient provision for rolling stock, repairing shops*, even assuming that no stock is now to be constructed on the line—very *scanty station, and watering accommodation*—very *inadequate sidings*—no special allowance for *clearing jungle during any stage of the work*. I notice that *well foundations* are mentioned by Mr. Molesworth, which point to uncertainty as to cost of foundations on some portion of the line. On the ghaut's sections, more particularly, small allowance appears to have been made for such works, as *drains, retaining walls*, and *protection works*—the extent to which these will be required can only be ascertained as the works proceed. It does not appear from the papers, that any definite monsoon experience has been obtained by the senior member of the survey staff on the ghaut districts. The rise in the price of iron should be taken into consideration, and the late fluctuations in Home prices must affect all items of English expenditure. I may be allowed somewhat to doubt the practicability of procuring through the Forest Department well-seasoned, sound teak sleepers, sawn out of mature timbers, in sufficient quantities at the price quoted of Rs. 1½ each, while the operations of the Railway contractors were proceeding in the immediate neighbourhood.

21. Can you state approximately what sum you consider should be added to Mr. Shaw's revised estimate in consequence of any or all of the deficiencies particularized in your last answer?

This would involve making an estimate which would occupy some time, but which I will do, if desired, so far as relates to those items upon which it is possible for me to form a judgment.

22. You have stated that considerable increases in the estimates will in your opinion be required, do you not think that there will be compensating improvements in the final location of the line, assuming further examination of the more difficult localities?

So much do I value careful investigation of difficult ground by a large and competent staff, that I am strongly of opinion that extended Survey operations, even in the vicinity of the line as now marked out and estimated for, would lead to such improvement in the alignments, and in the general character of the works, as would fully balance the extra quantity on the line as it now stands for such matters, as contingent earthwork and masonry, both in line works and protection works, which I conclude to be the chief contingencies to which the 15 per cent. is intended to apply in the Indian expenditure, capitalizing the gain in working expenses in addition to the actual saving in the execution of the work; but it is possible that the saving in quantities might be neutralized by the increased cost of labour which I anticipate. Extra provision would still have to be made for the other omissions to which I have drawn attention.

23. Will you specify any disadvantages under which the Kárwár Railway labours, so far as regards its construction, as compared with the Rájputána and Indore State Railways?

In addition to the difficult nature of the ground, particularly through the ghauts, I understand th at the jungle may fairly be described as impenetrable, and that the rain-fall is excessive between Kárwár and the summit of the ghaut, and, in fact, that for during half the year it will be a very arduous matter to keep any workmen at all upon the ghaut divisions of

the line. I would remark further, that all labour appears, at present, to command an exceptionally high price in this part of the country. The same observation applies to rates for road carriage. It appears to me also, that the work done in the busy months, more particularly the earthworks, will suffer materially while in an incomplete state during each ensuing monsoon.

24. However well chosen the route eventually adopted may be for 50 miles, comprising sections 2 and 3 of the line from Kárwár to Yellapur, are you of opinion that this Railway must constitute one of the most difficult engineering works of the State Railway being undertaken in India?

From all the information I can glean on the subject, it will be an unusually difficult operation to locate this portion of the line satisfactorily. It will also be difficult in the estimates to quote an approximate provision for contingencies; nevertheless the works need not apparently be exceptionally heavy for such ground: the waterway and consequently the masonry work in bridges and culverts would seem to be comparatively light. The difficulties with which the staff engaged on construction will have to contend, whether the work is executed departmentally or by contract, I consider will be extremely severe.

25. Would you consider the fact that contractors are ready and willing to tender for the Railway works, at the prices given in the estimates, any proof or guarantee that the line will be constructed for the estimated amount?

Certainly not.

MR. FORDE *examined.*

24th September 1872.

26. Are you acquainted with the estimates of any other State Railways besides the Kárwár Railway?

I have not seen the estimates of the Indore or Rájputána lines, but I have been preparing the estimates and plans for a narrow gauge line in Kattiawár, 60 miles in length which line traverses a somewhat heavy country, and is estimated to cost about £ 5,000 per mile?

27. Do you consider 15 per cent. sufficient allowance for contingencies on the Kárwár line.

Quite sufficient.

28. Do you consider it sufficient on the more difficult parts?

I deem it enough, taking the work as a whole, bearing in mind the rates in the estimates and the possible improvements in final location.

29. Are you aware there is no local labour in Kanara?

I am aware there is a difficulty about local labour.

30. Is it not the case that most Indian Railways, on this side of India, are not made with local labour?

I believe it is.

31. Are you not of opinion that local labour has in most cases materially aided in the construction of Indian Railways?

In most cases, I believe, labour has had to be imported. The amount of local labour depends upon the population in the district.

32. Do you think there will be more or less local labour on the Kárwár line than on other Indian lines within your knowledge?

The local labour will be less on the districts on the ghauts, and below the ghauts, where the population is scanty.

33. Does not the pay of the labourer greatly affect the cost of work?

It does necessarily.

34. Do you consider the rate for labour in the Kárwár reports high or low, as compared with the rates on other lines within your knowledge?

I deem them fair rates.

35. Would you consider a rate for coolie labour of 4 to 6 annas per diem on the Baroda Railway high or low?

I should consider it high.

36. The last estimate of the period of construction of the Kárwár line was four seasons. How do you think the construction could best be divided yearly, as regards English and Indian cost?

I should get the permanent-way materials out as rapidly as possible, and I should put the whole length from Kárwár to Yellapur in hand immediately, using the road for carriage of materials, and on the ghaut I should work both upwards from the foot, and down from Yellapur. I am unable to state precisely how the work would be divided into years.

37. Can you give any opinion as to how long the recent rise of prices of iron may continue in England?

It is impossible for me to offer an opinion on that.

38. Do you consider the price of £ 7-10 per ton for rails in the Kárwár estimates enough?

The price was fair when the estimates was made in the middle of 1871. I should now be inclined to put it at £10 a ton.

39. Do you consider the rates for Indian work in the Kárwár estimates high or low?

I consider them full: there is a short lead on the ghaut and both cutting and embankment are charged separately in the estimate.

40. From what source do you anticipate the sleepers for the line will be obtained?

From the Forest Department—teak sleepers 6′ × 8″ × 4″

41. And at what price?

Rs. 1½ each, delivered at certain points along the line.

42. Do you consider that price will suffice?

Yes, I do; looking at the cubic contents of the sleeper.

43. Do the plan and estimates which you have reviewed bear evidence of careful survey and preparation?

Yes; during the season 1870-71 a great improvement in gradients was made by Mr. Shaw. A ruling gradient of 1 in 40 was obtained on the ghaut in place of 1 in 30, and numerous cross sections were taken, but time did not admit of the line being re-located. I have not seen the result of the past season's ghaut-survey, but I was confident, from my investigation of former season's work, that great reductions were feasible. I calculated portions myself from the sections, and found the saving so great, that I was satisfied of the possibility of such further reduction.

44. Has any allowance been made in the estimate for cost of preliminary operations and survey?

No; but I deemed it would come in the contingencies.

45. Do the estimates provide for houses for the staff?

Not specifically; but it was contemplated to build the stations at once, and use them as quarters during construction. Houses must eventually be built.

46. Do the estimates include anything for repairing shops?

There is nothing for repairing shops or machinery. It was contemplated, that the repairs would be done in the running sheds.

47. What do you consider should be the expenditure on machinery for running sheds?

About Rs. 40,000.

48. Do you consider that any provision should be made for shops for the erection, or construction of the rolling stock?

Shops were not deemed necessary for so short a line, it being thought, that the rolling stock should be erected by contract.

49. Where would you propose that the rolling stock should be erected by contract?

At Kárwár, where timber is cheap and avilable.

50. Do you know any contractors at Kárwár who would be competent to undertake it?

I expect that contractors would proceed from Bombay to Kárwár to do it.

51. Supposing that there is a difficulty about the erection of engines at Kárwár, could they not be erected in Bombay and shipped to Kárwár?

Undoubtedly.

52. Do you consider the provision for station and watering accommodation on the line sufficient?

The stations are merely temporary stations, built for a minimum traffic at first; the watering facilities I consider adequate. I should contemplate additions hereafter to the stations which would not, in the first instance, suffice for the amount of traffic estimated by Colonel Trevor.

53. Do you consider the sidings provided in the revised estimates sufficient?

I think, as regards the 10 minor stations, the sidings are enough to begin with; and as regards the four larger stations barely enough—certainly inadequate for Karwár.

54. For a line with moderate traffic—taking the traffic on the Baroda line at present as a large traffic—what percentage would you add to the main line for sidings.

I would add five per cent., and I would take that as the addition on the Kárwár line when traffic is developed.

55. In computing the allowance for sidings, have you considered the inequality of traffic?

Yes, I look upon that as a matter of management.

56. Do you consider the sidings, 748 yards in length allowed for Yellapur, Hubli and Gadak sufficient ?

I consider the allowance enough in the first instance; but eventually, or when traffic is developed, it may require to be doubled.

57. Do you consider the siding allowed in the revised estimate sufficient in the first instance for the traffic estimated by Colonel Trevor ?

Not in the first instance.

58. Is there any special allowance in the estimatas for clearing jungle ?

No.

59. Do you consider there is any uncertainty about the foundations which are mentioned as well foundations by Mr. Molesworth ?

So far as I could see the estimate seemed to provide sufficiently for it.

60. Do you consider the estimates contain sufficient allowance for drains, retaining walls, and protection works on the ghauts ?

So far as I can judge, before the work is commenced, they do.

61. In considering the estimates, have you borne in mind the position of the Kárwár Railway in regard to the nature of the country traversed, and the climate ?

Yes, I have.

62. What do you consider would be the effect of a large importation of labour on current rates of work ?

I consider the effect would be insignificant.

63. What amount of proof or guarantee would you consider the fact, that contractors are ready and willing to tender for the railway works at the prices given in the estimates, affords that the line will be constructed for the estimated amount ?

With capable engineers and contractors it is of value as a guarantee.

64. Can you state what proportion the rates for earthwork in the Kárwár estimate bear to the rates for earthwork on railways elsewhere within your knowledge ?

The rate on the Kárwár line is 4 annas, as compared with 3 elsewhere ; and on the Kárwár ghaut, the rate for earthwork is 6 annas, as compared with 4 annas for similar work elsewhere.

65. When Mr. Shaw's estimate was made, what was the price of rails ?

We had prices at £ 6-15 per ton, but the price entered in the estimate was £ 7-10.

66. You estimated the rolling stock at Rs. 6,000 per mile, have you the detailed figures ?

Yes ; the figures are as under :—

20 Engines	at £	2,000	= £ 40,000
50 Carriages	at £	200	= £ 10,000
400 Wagons	at £	90	= £ 36,000
			£ 80,000

I deem this an approximate estimate only.

67. Have you anything to add to your observation on rolling stock in your memorandum of 29th September 1871 ?

No.

68. Do you think that the rolling stock will cost less or more per mile on the narrow-gauge than on the broad-gauge for an equal amount of traffic ?

Decidedly, less on the narrow-gauge. I estimate that when £1,000 per mile would suffice on the broad-gauge, £600 per mile would be adequate on the narrow-gauge.

69. You quote the traffic at Rs. 18,85,220, or Rs. 14,000 per mile for 109½ miles from Kárwár to Hubli, and Rs. 10,000 per mile for 35 miles from Hubli to Gadak ; on what authority do you give these figures, and what assurance have you that they are correctly estimated ?

I have adopted the figures given in para. 26 of Colonel Trevor's report, dated 29th September 1869, and para. 35 of Lieutenant Maryat's report, dated 15th August 1869.

70. Are you aware of the average rate per ton per mile which Colonel Trevor deemed a high assumption for the goods receipts ?

Yes, two annas a mile.

71. What tonnage of goods, at the rate assumed, would yield that portion of the earnings estimated to be divided from goods traffic ?

About 85,000 tons between Hubli and Kárwár.

72. What would be the mileage revenue therefrom ?

About Rs. 11,000 per mile per annum.

73. Do you know on what grounds Colonel Trevor assumed a traffic of 85,000 tons?
He seems to have based it on the printed papers appended to his report of 29th September 1871.

74. Are you aware, that Colonel Trevor in his report of 22nd September 1869, has taken Lieutenant Maryat's estimate of future export of cotton at 31,500 tons, and, making allowance for the development of traffic, that he has increased it to 35,000 tons of traffic; and that he has taken 40,000 tons as the present export and import trade of the six ports of Ratnagiri, Vengurla, Kárwár, Ankolah, Coompta and Honore, and allowing for development, has calculated this part of the trade at about 50,000 tons, the aggregate of these two making Colonel Trevor's total estimate of goods traffic 85,000 tons?
I am aware, that Colonel Trevor so estimated the goods traffic, and before accepting his figures as above, I looked through the papers, and satisfied myself as to his meaning.

75. Will you explain to the Committee precisely in what way you satisfied yourself regarding his figures?
By the examination of the statistics attached to his report.

76. Did you find from those statistics, that the present exports and imports of the six ports mentioned amount to 40,000 tons, irrespective of cotton?
It is about that quantity according to Dr. Forbes's report.

77. What was the amount of the cotton exported?
According to Dr. Forbes's report it was 22,908 tons.

78. The aggregate of these two is about 64,000 tons—can you now state what Lieutenant Maryat's estimate of the trade is?
Lieutenant Maryat's estimate is about 73,000 tons.

79. Can you explain the discrepancy between Colonel Trevor's and Lieutenant Maryat's figures?
As regards cotton, Colonel Trevor appears to have taken a mean between Dr. Forbes's and the Collector's figures.

80. Are we to understand then, that as regards the rest of the trade, Colonel Trevor has accepted the export and import returns, but, as regards cotton, has rejected the export returns, and adopted an estimate of produce?
I think he took, with regard to cotton, both the export returns and the estimate of produce into consideration.

81. After having accepted 40,000 tons as the export and import trade of all kinds, except cotton, has Colonel Trevor added 10,000 tons or 25 per cent. in his estimate of this part of the future goods traffic?
He has added 10,000 tons, making 50,000 tons, and I consider that covered all the anticipated traffic, except cotton.

82. Do you consider, that in estimating the traffic of the Kárwár Railway, it is proper to include the entire export and import trade of the six ports named, especially, Ratnagiri and Vengurla?
No.

83. What reduction, if any, would you make on the 85,000 tons on account of Ratnagiri and Vengurla?
None. I consider that a reduction has been allowed for by Colonel Trevor.

84. Looking at Colonel Trevor's figures which have been referred to, can you point out where the reduction has been made from the trade figures of the six ports?
No; but I understood from para. 21 of his letter of 29th September 1869, that in estimating 50,000 tons as the goods traffic of the line in addition to cotton, he had taken this into consideration.

85. The trade of Coompta is shown at about 40,000 tons, that of Honore at about 1,500 tons—do you consider that the entire export and import trade of both these ports should be included in the traffic estimate of the Kárwár Railway?
Yes; it will be absorbed in a few years from the opening of the railway.

86. Do you consider that the trade from places nearer to Coompta or Honore, than to any point on the Kárwár Railway, will go to make up the through traffic of the Kárwár Railway?
Yes; because carts can carry double the load above the ghauts than they can down the ghauts.

87. It has been calculated, that the whole of the goods traffic according to Colonel Trevor's estimate will give earnings at the rate of two annas a ton a mile, which he has stated amounts to Rs. 11,000 a mile per annum. Can you show in detail from Colonel Trevor or Lieutenant Maryat's figures how the remaining Rs. 3,000 a mile, to make up Rs 14,000 a mile, is obtained?

Para. 24 of Colonel Trevor's letter of 29th September 1869, answers this question. 'The difference is made up of Rs. 2,000 per mile for passenger traffic, and Rs. 1,000 per mile for miscellaneous. I consider these figures moderate.

88. When you adopted Colonel Trevor's estimates of traffic, had you not under your consideration the other reports, Lieutenant Maryat's and Dr. Forbes's for instance, and did you not endorse Colonel Trevor's figures on a general consideration and average of all his reports, rather than on his especial items and figures?

I endorsed his conclusions after examination of the whole of the reports.

89. Are you aware, that the average of cotton exported from Vengurla, Kárwár, and Coompta, is a little over 20,000 tons per annum?

I thought the average was higher.

90. Would you make any deduction on account of Vengurla knowing the distances from the railway and from the port?

I think not, as I believe the cotton would all find its way to the railway above the ghaut.

91. Are you aware, that the direction of the railway, though probably the best for the line, is not the best for the trade, that by taking the line so far to the north, a considerable portion of the trade, both of cotton and other commodities, will not be affected by the presence of the railway?

My opinion is, that the line as laid out will best serve the districts above the ghauts. I have examined the map, coloured all the cotton districts, and based my conclusion thereon. I think the railway will catch almost the entire trade.

92. Do you think the line will intercept the cotton from the districts south and south-east of Sirsi?

I think with a little trouble that result will be obtained.

93. Supposing the railway obtain a through traffic estimated at 50,000 tons of goods, do you consider such a traffic would justify the expenditure of a million sterling?

Yes.

94. How much under this figure of 50,000 tons, do you think would justify the outlay upon the railway?

I think as low a figure as 40,000 tons would warrant it. I would say that half the estimated traffic would give a return of 5 per cent. on a capital outlay of a million.

95. Do you think that the Kárwár Railway would command higher or lower goods rate than the G. I. P., Baroda, or Madras Railways?

I think higher than any, owing to its being the shortest route between the districts served and the sea.

96. Have you considered the actual rates which could be levied for the chief descriptions of traffic?

Not specifically. I have adopted the general average of 2 annas a ton a mile.

97. Are you aware, that the G. I. P. and Baroda Railways have not yet been able entirely to overcome the local cart competition?

Yes; and that there are reasons in each case, the chief being on the G. I. P., the great advantage the road has in distance, for example, between Lanauli and Bombay, and the trebling of the charges on the ghaut; also the geographical position of the railway. These reasons cannot apply to the Kárwár line.

98. Do you concur in Mr. Halsey's expressed opinion, as to the effect of cart competition on the railway?

I do not.

25th September 1872.

99. With regard to the working expenses, can you give any estimate about the cost of maintenance per mile per annum?

I put in some statements, which I have prepared, excepting Colonel Trevor's traffic figures and from these statements it will be seen that I estimate the cost of maintenance at Rs. 986 per mile per annum.

100. I gather from these statements, that you are of opinion that the Kárwár Railway will cost less than half per railway mile to maintain, than the G. I. P. and Baroda Railways have hitherto cost?

I am; and the cost is about the same on the Madras Railway, and 80 per cent. more than the Great Southern of India. The reduction as compared with the other Bombay Railways is, that the goods weight to be carried on the Kárwár Railway is calculated at 609 tons daily, whereas on the Baroda and G. I. P. it is 2,009 and 2,057 respectively.

101. I observe in your statement that you have treated of the Locomotive outlay; at what price per ton have you estimated the wood fuel?

Rs. 5 per ton, delivered on the railway.

102. What total consumption of wood fuel, per annum, have you estimated?
About 7,300 tons of wood.

103. What quantity of average wood fuel would you consider equal to one ton of average English coal?
I have taken in my calculations 2 tons of wood as equal to 1 of coal.

104. Do the statements which you have put in accord with the calculations as to working contained in your memo. of 29th September 1871?
Yes, but they are based on the working statistics of one year later, *i.e.*, 1871.

105. On the question of ghaut working, have you anything to add to the views submitted in your memo. of 29th September 1871?
No.

106. Do you propose to use additional engines for the ghauts?
No.

107. Over what period of the year would the 200 days extend, during which the mixed trains would take down to the coast an average of 50 tons daily, returning with 10 tons daily; this is with reference to para. 32 of your memo. of 29th September 1871?
During the fair season extending from October to June, 242 days.

108. Over what period of the year would the 666 special trains, and the 296 other trains, also mentioned in para. 32 of your memo. be run?
During the same period.

109. Your traffic calculations assume 70,000 tons to Kárwár and 15,000 tons from Kárwár. Supposing that the traffic in both directions was more equal, your calculations would require modification?
Yes.

110. Supposing that the modification gave an increased proportion of the tonnage to be hauled up the ghaut, and a decreased proportion of the tonnage to be hauled down the ghaut, what general effect, do you consider, that would have on the working outlay?
It might, according to circumstances, be either an increase or a decrease. It will be an increase if the additional traffic up the ghaut has to be hauled at the season when the traffic down the ghaut is heavy, as I have estimated that the waggons by all special trains will return empty. It will be a decrease if the trains are partially loaded on their return.

111. Have you calculated the probable average working cost per ton mile, paying, and dead load, included on the anticipated traffic on the Kárwár line?
Yes, the figures are as under:—

	per ton per mile.	
Cotton unpressed	7·2	pies
„ half pressed	6·0	„
„ full pressed	5·2	„
Grain, coal, salt	3·6	„

112. Do you contend that goods can be carried on the narrow gauge at a lower average cost, per ton, per mile, than on the board gauge?
Much lower, in consideration of the great diminution of the proportion of dead weight on the narrow gauge.

113. Do you consider the average rate for goods which you have adopted in your estimate of traffic, high or low, looking at the cost of carriage in the district?
Low as compared with the prevailing rates of local carriage.

CAPTAIN HEWETT, I. N., *examined*.

114. Are you acquainted with the harbour at Kárwár?
I have been there three or four times during the fine weather, and once during the South-West monsoon. 26th September 1872.

115. Do you consider Kárwár harbour affords shelter to shipping, moored or riding at anchor, from those points of the compass from which storms and heavy seas are accustomed to occur?
I consider it affords fair shelter.

116. From what points of the compass expressed in degrees, are you of opinion, it is necessary, ships lying in Kárwár harbour should be protected?
From the North-West edge of the protected area marked on the chart, Kárwár-Head bears about W. 20° S. The shelter afforded by the head-land at this position is great; but to make it more complete, additional protection is required from the above bearing to about West.

117. Are gales from the West experienced on this coast?

Dangerous gales from that quarter appear to be extremely rare. I have heard only of one which occurred in June 1837, near Bombay, and that was probably part of a cyclone.

118. Are you aware that the monsoon at Bombay and at Karachee comes more from the West than the South-West?

Yes, but when the wind veers to the northward, the swell continues to come from West-South-West.

119. Do gales never occur from the North of West which would imperil the safety of ships lying in the port of Kárwár?

It is very improbable that such gales should occur.

120. Supposing a ship moored at the central deepest point in the protected area marked by the Port Officer, would such a ship be exposed to the open sea from 3° South of West to 10° West of North?

No, not to its full force, the harbour being partly sheltered by the out-lying islands.

121. For what sized ships, for what draught, and for what number of ships do you consider Kárwár harbour a safe port?

It will afford safety for vessels drawing 17 feet of water, but I could not say how many could be accommodated.

122. Why do you limit the draught to 17 feet?

Because that allows a margin of from 3 to 5 or 6 feet at low water, which is not excessive during the rough season. In fine weather, with smooth water, vessels might load to 19 or 20 feet.

123. Could a vessel of 1,200 to 1,400 tons, drawing say, from 20 to 22 feet of water, find safe shelter in Kárwár harbour at all seasons of the year?

No.

124. In what depth of water would it be safe to moor a vessel drawing, when laden, from 20 to 22 feet of water?

During the South-West monsoon in not less than 29 or 30 feet; but at Kárwár in that depth, her position would not be a safe one.

125. Supposing the Government of India desired to make Kárwár the base, or sea-port of a system of railways, are you of opinion that the natural capabilities of the Kárwár harbour are such as to justify the anticipation, that the port is, or at a practicable expense could be made, a commodious port for a fleet of merchant shipping?

Yes, for a limited number of ships.

126. A system of railways has been projected to converge at Kárwár; would such a system, if carried out, bring more trade to the port of Kárwár than could be sea-borne in a few steam vessels calling occasionally?

Yes, I should conjecture that it would.

127. Supposing the chief export from Kárwár is greatest towards the close of the fair season, ought the port to give shelter to shipping heavily-laden when the South-West monsoon sets in?

Yes.

128. Is that the most dangerous time of the year for shipping on this coast?

Yes.

129. Are you acquainted with the nature of the protective works which have been proposed by different authorities for the improvement of the port of Kárwár?

Yes.

130. Have you formed any opinion on the subject yourself. If so, would you state your views?

I prefer the breakwater project from Kárwár-Head to the conversion of the cove into a wet-dock.

131. Why so?

It would leave more room for shipping, and at the same time afford adequate protection.

132. It may be observed from the chart, that a sandy isthmus connects Kárwár-Head with the mainland. Can you account for the formation of this isthmus?

No.

133. Beitcul cove is very shallow is it not, and a portion is dry at low water?

Yes.

134. Then is it your opinion, that the natural process which may have caused the formation of the isthmus at Beitcul is still in action?

It may be so, but on comparing the depths of water in Taylor's chart of 1855 with those recently taken, I do not perceive any decrease in the soundings.

135. How would you account for the formation of the sandy beach between Konay creek and the Kala Nuddee river?

It may be caused by the silt brought down by the river checked by the westerly swell.

136. Would you say that the harbour of Kárwár is in the delta of a river?

Scarcely so.

137. Is it your opinion that the harbour of Kárwár must eventually be filled up?

I should say not.

138. There are arrows marked on the chart, what do they indicate?

They are intended, I imagine, to indicate the direction of the current.

139. The river brings down a great quantity of silt, must it not, and the river current with the silt is checked by the westerly swell, causing a deposit of silt somewhere. In your opinion, therefore, where is the silt deposited?

Supposing the sandy beach to result from the deposit of silt brought down by the river, I should say, that the bulk of it forms at the mouth of the river, but a large proportion appears to be carried along the coast to the southward.

140. Do you think the project for making Beitcul cove into a tidal-basin a practicable one?

Yes, but it does not appear to me to be a very good plan.

141. Do you think it practicable to accommodate even European shipping in such a basin?

Yes.

142. What is likely to be the maximum size of the shipping visiting Kárwár from Europe?

I should say steam vessels probably from 1,000 to 2,000 tons burden drawing, when laden, from 17 to 20 feet.

143. Do you consider there are very strong reasons why the breakwater project should be preferred to that of a tidal-basin? 27th September 1872.

Yes, if it has not yet been found that from the month of January up to the termination of the strong North-Westerly winds there has been any difficulty in unloading vessels.

144. What position would you advocate for the breakwater?

I would prefer the position already marked on the chart.

145. What length of breakwater would you recommend?

I should say 1,000 feet in length would be sufficient.

146. Would that be 1,000 feet from the shore?

No, I would leave a gap of 200 feet at the shore end.

147. Would such a breakwater be exposed to the South-West swell?

If carried in a North-North-East direction, the swell would strike upon it at an angle of about 30° to 45° from the perpendicular.

148. Do you think such a breakwater would be exposed to a force of sea equal to that at the Manora breakwater at Karachee?

No, it would have the advantage of receiving the sea generally at a greater angle.

149. Do you think it would require to be constructed as solidly as the Manora breakwater?

Yes.

150. With reference to your reply to question 143, do you consider that in the period previous to January, that is from October to January, there is in the present state of the harbour any difficulty in vessels loading and unloading?

I am not aware there is.

151. What number, and what sized vessels, could find shelter in the port of Kárwár, if the breakwater you propose was to be constructed?

I should say about 20 vessels drawing from 15 to 21 feet, if at fixed moorings.

152. Are you of opinion that sailing-ships can with safety enter and leave the port of Kárwár at all seasons of the year?

I am unable to speak from my own experience, but from all the information I have been able to gather, I believe that ships with good working qualities can, except from the short period of heavy weather with which the South-West monsoon usually commences.

153. What increase in number of vessels and in class do you suppose the works you advocate would add to the present accommodation of the port?

It would more than double the tonnage, and would accommodate vessels drawing 4 feet more water.

154. Could the accommodation be increased at any time?
Yes, by lengthening the breakwater.

155. Why would you leave a gap in the shore end of your breakwater?
Because the position of the gap is where a deposit of silt, if brought down by the current, would be carried off.

156. Would not the nature of the bottom, and the amount of swell, materially affect the depth of water required for safety under a ship's bottom? You have previously stated that a vessel drawing 22 feet would require 29 feet water.
Yes.

157. Are you aware of the ordinary, or extraordinary, amount of swell experienced at the outer buoy shown on the chart?
Yes.

158. Are you aware of the nature of the bottom at or about that buoy?
Yes, the bottom is muddy.

159. At the buoy, the depth is marked as 22 feet, which diminishes to 17 feet off the entrance to the cove. What draft of vessel, considering the swell and the nature of the bottom, could lie in 22, 20, and 19 feet ?
Vessels drawing from 16 to 17 feet?

160. As the port now stands, is there room for 5 or 6 steamers, drawing 17 feet when laden, to lie and load in reasonable security, from October to June ; and could two or three lie and load between June and October ?
I believe they could remain there in reasonable security, but I am not sufficiently acquainted with the port to be able to say whether they could load and discharge cargo at all times.

161. You stated that the silt brought down by the river is the origin of the sandy beach between the mouth of the river and the cove. Is the sandy beach confined to that part, or does it differ from the ordinary sandy beach to the north of the river mouth as well as all along the west coast of India ?
I am not aware that it does.

162. Would you state what the bottom of Beitcul cove consists of at the upper or shallow end, and at the outer or deeper end ?
From the chart I gather that the upper consists of sand and the lower of mud.

163. From this would you infer that silt is transferred from the outer end of the cove to the inner end ?
I can't say that such is the case, but it might be.

164. In the changed state of the trade, in consequence of the opening of the Suez Canal, how long do steamers of 1,000 tons generally remain in harbour in Bombay ?
I am not sufficiently acquainted with the subject, but I should say, I have noticed that the discharge of cargo from Canal steamers is very quickly carried out.

165. Is it not a fact that owing to the opening of the Canal, the transfer of trade to steamers, and the expedition used in unloading and loading, that the number of vessels lying in Bombay harbour at any one time is much decreased, compared to the time when the trade was carried on by sailing-vessels ?
Yes, though I assume the trade to be in no respect decreased.

CAPTAIN PARKER, I.N., *examined.*

28th September 1872.

166. You are Port Officer and Conservator at Kárwár?
Yes.

167. What is the length of your experience of Kárwár ?
Nine years and a half, with an interval of 15 months.

168. Do you consider Kárwár harbour affords shelter to shipping, moored or riding at anchor, from those points of the compass from which storms and heavy seas are accustomed to occur?
I consider Kárwár harbour safe for shipping at all seasons of the year to vessels at moorings, provided, that during the South-West monsoon they do not draw more than 19 to 20 feet when laden.

169. From what point of the compass, expressed in degrees, are you of opinion, it is necessary, ships lying in Kárwár harbour should be protected ?
From South to West 90°.

170. Are gales and heavy seas experienced on this coast from the West ?
No.

171. Are you aware that the monsoon at Bombay and at Karachee comes more from the West than the South-West?

It does come from about West-South-West, or 22½° South of West.

172. Do gales never occur from the North of West, which would imperil the safety of ships lying in the port of Kárwár?

I am not aware of any causing either danger, or inconvenience, to loading, or unlading, operations.

173. Supposing a ship moored at the central deepest point in the protected area, marked by yourself on the chart, would such a ship be exposed to the open sea from 3° South of West, to 10° West of North?

No, the harbour is sheltered by the land and by islands from North to N. W. ½ N.

174. For what sized ships, for what draught, and for what number of ships, do you consider Kárwár harbour a safe port?

Moorings could be laid down for about 15 ships, in from 16 to 22 feet low water spring tides, sheltered from wind and swell at all seasons of the year.

175. Could a vessel of 1,200 to 1,400 tons, drawing, say, from 20 to 22 feet of water, find safe shelter in Kárwár harbour at all seasons of the year?

Moorings could be placed for two or three vessels of that size in 24 feet of water L. W. S.

176. What margin below the keel would that leave?

Two feet at lowest spring tides, and four feet at neap tides.

177. Do you think that margin would be sufficient for a laden ship?

I think it would, the time would be so limited.

178. It is said, that the buoys marking the dangers at the harbour entrance, marked on the chart, have been carried away several times, both chains and anchors being lost: is that so?

Yes, it happens nearly every monsoon at the first burst: the buoy marking the danger in the south channel generally goes adrift, the other buoy not so often.

179. The South-West monsoon swell curves round Kárwár-Head, and breaks on the beach, does it not?

Yes, the swell breaks on the beach near the new Jail during the worst weather in the monsoon, which is generally at the commencement.

180. You have marked a protected area on the chart. Do you mean that that area is thoroughly protected at all seasons?

Yes, sufficiently protected to enable ships to load or discharge cargo in safety.

181. Supposing the chief export from Kárwár is greatest towards the close of the fair season, ought the port to give shelter to shipping heavily-laden when the South-West monsoon sets in?

Yes.

182. Is that the most dangerous time of the year for shipping on this coast?

It is.

183. Do you think the port of Kárwár could be improved?

Yes, very much indeed.

184. Are you acquainted with the nature of the protective works which have been proposed for the improvement of the port of Kárwár?

Yes.

185. Have you formed any opinion on the subject yourself. If so, would you state your views?

I am of opinion, to make the port commodious and secure for ships of all sizes, the best plan would be to dredge out the cove to form a deep-water tidal-basin.

186. Would you explain more fully how you would propose to form this basin?

I would dredge out the cove to a depth of, say, 24 feet at low water, and secure about 20 acres for the basin, leaving space for wharves to be built, and slips or jetties if necessary. This would provide ample space for about 60 vessels, moored head and stern.

187. What is the present available area for the fifteen ships mentioned in your answer to question 174?

About fifty acres with from 16 to 22 feet water—including a portion at entrance of cove.

188. An isthmus connects Kárwár-Head with the mainland. Can you account for the formation of this isthmus?

I think Kárwár-Head must have been an island at some remote period, and that a channel existed between the island and the mainland.

189. Do you consider that the channel has been closed by some natural process?

Yes.

190. And that this process is still in action?
No, it is not.

191. There is a great deal of mud in the harbour and cove is there not?
Yes, there is in the harbour and cove.

192. Where do you suppose it comes from?
It must, I think, have come from the river, at some remote period.

193. Is Kárwár harbour at the delta of a river?
Partly.

194. Does silt come down the river?
A small quantity.

195. What becomes of this silt?
It works round the shore, does not enter the cove, and scours close round the Head. This is during the South-West monsoon.

196. Is the mud in the harbour this silt?
I don't think so.

197. What causes the current round the harbour to the south?
In the South-West monsoon, the current sets to the southward, and when there is a flood in the river, the beach between the river, along the front of the Jail, is covered with firewood and debris.

198. Does that show a deposit is taking place along this beach?
No, I think not. It is only the floating substances which are washed ashore.

199. Is there any difference in the composition of this beach and the mud in the harbour?
Yes, there is a difference. One is sand, the other mud.

200. How do you account for the differences between the two deposits?
I can't account for it satisfactorily.

201. Do you suppose the mouth of the river was far inland in remote times?
It was different to what it is now, but I do not think it was far inland.

202. Are you of opinion that the natural processes which caused the formation of the isthmus and the deposit of mud in the harbour are still in action?
To a very slight degree no difference is perceptible for the last twenty years.

203. If the cove was to be dredged out as you propose, would it not fill up again?
No. One good dredging would I think keep the silt out of it for ten years. I think a dredge would have to be at hand for removing any silt that may possibly take place.

204. Was the mouth of the river formerly to the North-West?
By the charts it was.

205. Is the mouth now in a more southerly direction?
Yes, slightly.

206. How do you account for this change?
I think the mouth of the river is taking a direction in a line with the river.

207. Does the mouth being more to the south tend to form a bank to the North?
I think not.

208. Is the dredging of the cove all you would propose?
I would propose wharf walls being built on each side of the cove with stages run out for large ships to be alongside at all times of the tide.

209. Would not dredging the cove interfere with the construction of wharf walls.
They must be well founded.

210. Would the dredging necessitate the removal of the present wharf walls?
I think it would.

211. Do you know of any other protective works which have been proposed for Kárwár?
Yes, a breakwater from Kárwár-Head.

212. Have you any remarks to make on the project for a breakwater in comparison with the project you have advocated?
The cove-scheme would be far superior.

213. Which do you suppose would be the most expensive scheme?
I think the breakwater would cost the most. The cove-scheme would probably pay itself in about ten years by wharfage and other fees.

214. What is the size of the cove?
The space proposed to be dredged is 750 feet broad by about 1,000 feet long, the whole extent of cove is 2,000 feet long by 750 feet broad.

215. How would you propose to get 24 feet depth of water in the cove?
I would dredge it out, and then make the wharves.

216. Is there any swell in the cove at any time?
No.

217. What is likely to be the maximum draft of the shipping visiting Kárwár from Europe?
Not more than 19 feet when laden. A steamer with this draft would be about 1,300 tons. A sailing-ship of the same size would draw perhaps a foot more.

218. Why then do you consider it advisable to have 24 feet of water in the basin?
To accommodate shipping of any size, but 22 feet might be sufficient.

219. What increase of trade and tonnage of ships visiting Kárwár would necessitate the adoption of the tidal-basin project?
If the imports and exports amounted to 100,000 tons that fact would justify the expenditure required; there need be no difference in size of vessels.

220. If the railway was commenced would a new pier be required?
Yes it would.

221. Where would you recommend the railway should be brought to near Beitcul cove?
To the end of the cove near the old Jail, and I would recommend, if it is to be carried on seawards, its being carried on the Kárwár-Head side so as not to interfere with the present wharf and pier.

222. For an annual trade of 50,000 tons spread chiefly over about half the year, do you consider any increased wharfage accommodation is required at Kárwár?
Yes, an extension of about 25 or 30 feet seaward of the present wharf wall, between the pier and the cove, so as to enable cargo boats and native craft loading and unloading at all times of the tide.

223. What would be the nature of the wharfage construction you would propose?
Landing stages parallel to the present wharf on piles. The present pier might also be lengthened 60 feet with advantage.

224. Taking into consideration the tidal-basin scheme, are rocks, or boulders, likely to be met with below the wharves?
On the opposite or southern side of the cove the shore is rocky.

225. Would the rock, or boulders, be likely to interfere with screw piling?
No.

226. For this basin project must the whole of the mud be dredged out?
No.

227. Do you consider there is sufficient room for godowns and stowage of goods to accommodate a trade of 50,000 tons near the present quay and pier?
Yes, with good management, and no appropriation for railway purposes of any ground in the immediate neighbourhood.

228. Would this exclude the railway premises from the ground at present occupied by the Executive Engineer's stores?
Yes. There is plenty of room for the railway without trenching upon that ground which should be appropriated for stowage.

229. As the port now stands, is there room for 5 or 6 steamers drawing 17 feet, when laden, to lie and load in reasonable security from October to June, and could two or three load between June and October?
Yes, with perfect safety.

230. Does the beach between the Konay nullah and the river change during the year?
It does, the sand is washed away during the South-West monsoon, and is replaced at other seasons.

231. What currents have you in the bay?
At one season, it sets South, and, during the North-East monsoon, it sets North. The bay is scoured out during the South-West monsoon, and slight deposits are made again in the North-East monsoon. The greatest scour occurs close in shore round Kárwár-Head.

232. Two opposing forces, therefore, contend during the year to cause the deposit of river silt on one side or the other?
No, not silt but sand is deposited.

233. What becomes of the silt?
It goes out to sea.

234. Do the points of land on each side of the river mouth advance seawards?
Banks from on each side at different times of the year. They are washed away and form again.

235. Has not the South-West monsoon a constant tendency to form a bank or bar between Connaghur and the river mouth, and thus to check the river from opening out into the southern part of the bay?
It has a tendency to form a bank.

236. In the event of the river forming an opening to the southward of Connaghur in an exceptional monsoon, the South-West monsoon would throw back the silt brought down by that new mouth, and again reconstruct the bar throwing the river back into its old or northerly course. Is this the case?
I think it would most likely have that effect.

237. Is not this effect consistent with the history of the location of the river's mouth as shown on the chart during the last 50 years?
Yes, it is.

238. Would it be possible to do anything at a small expense to give greater permanency to the bar or spit at the left bank near the river's mouth, and thus prevent its opening south of Connaghur into Kárwár bay?
Yes, I think the southern bank could easily be strengthened, and I recommended some years ago that this should be done.

239. What was the nature of your recommendation?
I pointed out the possible danger of the river opening more to the southward, and suggested measures should be taken to prevent it.

240. What is the distance between the present mouth of the river and the cove?
About 2¼ miles.

241. Is there any difference in the depth of water in the cove and anchorage now and that recorded by Lieutenant Taylor, on his chart of 1855?
I have taken careful soundings all over the bay and there is no perceptible difference.

242. You have above stated that Kárwár harbour is at the delta of the river. By that do you mean that the port is affected by the alluvial deposit brought down by that river?
No, I don't mean to say that any deposit takes place from the river into the harbour, but that the mouth of the river opens into the northern portion of the bay.

243. You have mentioned a breakwater, would you describe this projected work?
The breakwater if adopted should run out in a North-North-East direction from Kárwár-Head as shown on the chart. This work would break the force of the westerly swell and give shelter to shipping inside.

244. What length of breakwater would be of use?
Five hundred yards would give a breakwater of great use, but the longer it was made the more shelter it would give. An opening should be left at the shore end so as to prevent the breakwater obstructing the scour of silt round Kárwár-Head.

245. Would such a breakwater be exposed to a heavy swell?
It would, but not to the full force of the swell outside.

246. Would the South-West swell strike it perpendicularly?
No, it would strike it obliquely.

247. Would it require to be very solidly built?
Yes, but after a few years the shell-fish would bind it together and make it very strong.

248. What depth of water would be available for ships if a breakwater 500 yards long was to be run out?
27 feet low-water spring tides.

249. Why do you prefer the tidal-basin project to the breakwater scheme?
If the basin were made complete, protection from all winds would be obtained, and the water would be smooth. The breakwater would not give such complete shelter.

250. Has the question of expense guided you in any way in forming your opinions?
It has not.

30th September 1872.

251. Is the anchorage at Kárwár good or bad?
It is not particularly good holding ground for ships at anchor.

252. Do you therefore for all vessels at all times recommend the use of moorings?
I should generally, more particularly during the South-West monsoon. Steamers calling for a short time can remain at anchor.

253. Is the preference you state for moorings on account of the anchorage ground not being good, or on account of the confined space.
For both reasons.

254. What is the amount of wharfage and pier accommodation at present?

The pier is 60 feet by 60 feet with six feet low-water spring tides at the end of it, and three feet at the shore end. The wharf is about 800 feet long, and at the pier end has three feet low water spring tides. At the other end one foot of water. The rise and fall of the spring tides is about seven feet.

255. With reference to your reply to question No. 222, will you explain to what portion of the wharf you would desire an extension seawards?

About 150 yards from the pier south. The pier should also be lengthened 60 feet, or another pier be constructed independently of the new pier required for railway purposes.

256. In case if a new pier was constructed where would you place it?

I would place it 100 feet north of the present pier, but I should prefer an extension of the present pier.

257. Is any difficulty experienced in fending off the pier laden cargo boats?

Not with proper precautions.

258. But will the cargo boat people take these precautions?

No, they cannot be depended upon to do this.

259. Would not your staging be liable to damage from concussion?

Not so much as the pier.

260. Your large project mentioned in questions No. 208 and 219 includes staging for shipping to come alongside. Would not such a staging be very liable to damage?

Yes, if not strongly built.

261. But could sufficient strength be given to such structures?

Yes, certainly.

262. Must the ships be fastened to the stages?

Yes, while lading.

263. As the commanders of vessels would not be directly responsible for the safety of the stages, would not these stages be very liable to damage?

It would be the duty of the Port-officer's department to make arrangements for the protection of the jetties.

264. Would you prefer these large wharves and jetties being built on piles to solid masonry wharves?

In the large tidal-basin project, the wharves should be solid masonry with 12 feet water at low tides. The jetties to be run out on piles.

265. Would there be any objection to these jetties being made to float and thus rise and fall with the tide?

No, such jetties would be preferable.

266. Would any length of breakwater be of service in increasing the natural shelter of the port?

Yes, 100 yards would be of service.

267. Referring to the subject of the great expenditure from the port dues of the southern group upon the port of Kárwár alone, it is understood that a claim for a greater amount of port dues than falls now to its credit as the first port of call has been put forward. What amount would you claim, and on what grounds would you support that claim?

Owing to our position on the coast we get only about a sixth, and I would claim a third.

268. How do you arrive at this proportion?

Because Ratnagiri and Vengurla are the only other ports of importance. Also I claim on the tonnage calling at the port.

269. Would the wharfage dues place Kárwár at a disadvantage?

No, I think not, with moderate charges.

270. Are you quite sure that a new pier to the north or rather the east of the present pier would be preferable on the whole, considering the prevalence of the North-West winds at one period of the year, to a similar pier to the south of the present one with sufficient interval?

I have not given the subject much consideration, but would prefer the extension of the present pier.

271. By the extension of the present pier, you would provide considerable additional accommodation for vessels drawing up to 10 or 12 feet L. W. S. at, of course, some considerable expense, but this would not provide the additional accommodation required for cargo boats, and small craft, for which 4 or 5 feet water L. W. S. would suffice, and which could be provided at a comparatively smaller expense?

The extension of the wharf would meet the wants in that respect.

272. Suppose the dredging out the cove as a basin is not undertaken, do you consider it advisable to further encroach on the water-area of the cove by permanent walls?

No wall should be built in that case: the extension of wharfage should be on piles.

273. The buoys on the two rocks North-West and South-East of the Oyster Rocks are constantly washed away, would you, therefore, recommend any improved method of marking the dangers?

I would strongly recommend beacons being set up in lieu of buoys.

274. Do you know the present cost of putting a 400 lbs. bale of cotton from the shore on boardship in Bombay, Coompta, and Kárwár?

At Kárwár Rs. 1-1-1 per ton weight or 3 annas.

From Press House to wharf each pressed bale or 5 annas 1½ pies, for 672 lbs.

At Coompta 6 annas 8 pies per ton, or 2 annas per candy of 4 docras of 168 lbs.

From wharf to pattimar, each (average) or 672 lbs.

C. J. SHAW, Esq., Chief Engineer, Kárwár and Hubli State Railway, *examined.*

28th September 1872.

275. You are Chief Engineer of the Kárwár and Hubli State Railway?

I am.

276. You have had much experience in the construction of railways and other civil engineering works, have you not?

I was a pupil of Mr. I. Simpson, late President of the Institution of Civil Engineers, and, whilst I was with him, I was engaged on the new River and Hereford Water Works. I was also employed in checking the calculations of the Committee appointed in 1857 by Government to examine the different drainage schemes for London. I was afterwards employed by Captain Moorson on railway surveys in England, and on leaving him, I was engaged on railways in South America for four years. I returned to England in June 1862, and in January 1863 arrived in India, and was employed in the G. I. P. Railway up to 1870, when I was appointed Chief Engineer of the Kárwár and Hubli State Railway. My total experience of engineering works has been nearly 19 years.

277. You are well acquainted with the nature and resources of the country through which the projected line for the Kárwár and Hubli railway passes?

Yes, I am well acquainted with the country and its resources as far as the construction of the railway is concerned.

278. What do the latest estimates for the 144½ miles of railway from Kárwár to Gadak give as the average mileage rate?

Rs. 50,200.

279. Is this rate exclusive of rolling stock?

It is.

280. Do you consider the latest estimates sufficient for the construction of the line?

Decidedly.

281. Do you think there will be more or less local labour on the Kárwár line than there has been engaged on other Indian lines with which you are acquainted?

From the 18th to the 94th miles labour will have to be imported—but this is the case on all Indian Railways. There is, however, probably less local labour available on this portion of the line than I have met with on other portions of Indian Railways with which I am acquainted. But in the Asirghar jungles I believe there was as great a deficiency of local labour as will be experienced on the Kárwár line.

282. Are you of opinion that the location of the line can be improved in certain parts of the country which would tend to reduce the estimates?

Yes, from the 17th mile to the 21st, I am of opinion that the gradient can be reduced from 1 in 80 to 1 in 100 without any increase of work. Also, where the heavy tunnelling is encountered on the ghauts past Kenchmuney, I am of opinion, that the tunnelling by a fresh location can be reduced by 264 lineal yards, and further, from the crossing of the Sleemuney river to Beerguddy, a diminution of work of 25 per cent. can be effected. The distance affected by these deviations is about three miles.

283. Are these deviations on the high level line?

Yes.

284. What is the total length of tunnelling on the line?

About 1,100 yards.

285. Is this all rock tunnelling?

In my opinion it is not, the borings taken confirm this view. The tunnel out of Kárwár, which is about 213 yards long, may be through granite.

286. What do you propose to build the masonry works of?

Common rubble masonry, and in bridges of 20 feet span and upwards, the arching to be of block-in-course.

287. Is stone plentiful where you will require it ?
Yes. The average lead for stone between Kárwár and Hubli, will be 3 miles.

288. Are you going to use laterite at all ?
No. Mr. Molesworth objects to the use of laterite on other work than stations and platforms.

289. Does the district furnish lime ?
Yes, on the sea coast, and 12 miles from Yellapur there is limestone to be met with. At Kulgutghee there are large kunker quarries, and generally from Kulgutghee to Gadak kunkur is obtainable in large quantities, and at easy distances.

290. Is there any stone between Hubli and Gadak ?
Yes, near Hubli, and at Anigherry there is gneiss. At Gadak there is a large quantity of stone in the fort which the Collector is willing to sell. Stone can also be obtained from Kosegal within six miles of Seergoopee. There is in fact no deficiency of stone.

291. Are your masonry works between the ghaut and Kárwár to be built with the lime of the district ?
Yes, with the exception of where wet foundations are met with, where I should prefer the use of hydraulic lime.

292. The limestone on the ghaut is very pure, is it not ?
Yes, nearly pure carbonate of lime.

293. Will you be able to use it ?
Not without a great admixture of burnt clay.

294. Will the shell-lime be sufficiently good for your purposes ?
Yes, excepting for wet foundations.

295. Will the lime have to be carried a long way for the works?
It will have to be carried in No. 1 district an average distance of 5 miles. In the 2nd district an average distance of 15 miles. In the 3rd district an average of 26 miles, and from Kulgutghee to Gadak, lime is abundant throughout the district.

296. In your list of rates you have entered from 9 to 11½ Rs. per cubic yard for rubble in bridges of 20 feet and upwards. What kind of work does this rate cover ?
Common rubble in piers and abutments.

297. Does it include coigns and facing ?
No, it includes neither coping, caps, coigns nor springers.

298. Is your rubble to be coursed or random ?
It is to be common rubble, not coursed. Common rubble without face work or coigns.

299. Do you think you will be able to get your concrete under Rs. 4 a yard ?
Yes, I do.

300. Do you consider you will be able to get your broken-stone ballast for the rate given in your list?
I do not propose using stone ballast except on the ghauts. The price Rs. 2 is high. Broken-stone ballast is stacked alongside the Nizam's line where required to be used at 14 annas per cubic yard. On other districts there is an abundance of shingle for ballast.

301. Is that the ballast for which you have entered the rate of 12 annas a yard, and a rupee on No. 4 and 5 districts ?
Yes.

302. Does your rate for earthwork include settlement ?
Yes.

303. The rainfall between Kárwár and Yellapur is heavy, is it not ?
Yes.

304. Is it greater than the rainfall the G. I. P. Railway is subjected to between Bombay and Lanauli ?
I can't say.

305. The greater the rainfall the more substantial must be the works, must they not?
I don't see that it follows. In Sind, where the rain-fall is small, 9 inches a year, as great destruction has occurred to the railway as has happened to other railways on districts where the rainfall has been 80 or 90 inches.

306. Do you expect to be able to hammer-dress your granite rubble ?
Yes, I do, but it requires very little as it quarries with a capital bed.

307. Have you any block-in-course walls ?
No.

308 Do you expect to get your timber for Rs. 3 per foot ?

Yes, I do, considering the rate at which the Conservator of Forests has agreed to supply square sawn teak-wood sleepers, viz., Rs. 1-8-0, each containing 1½ cubic feet.

309. Does that include scantlings and fixing ?

Yes. The quantity required is very small, and this price is 8 annas more than what Nicol & Co. deliver scantlings for at the barracks at Belgaum. This too is Moulmein not Kanara teak.

310. What is your rate for tunnelling work ?

100 Rupees per lineal yard.

311. What would be the contents of a lineal yard of tunnel ?

15½ yards, which gives a price of over Rs. 6 a yard for excavation. The tunnels on the G. I. P. Railway contained 66 cubic yards for one yard forward, and was let to the contractor for Rs. 400 the lineal yard, or Rs. 6 the cubic yard forward. Now the Bagara tunnel, upon which I was employed, was sublet by the contractors to a sub-contractor for Rs. 200 a yard forward, at Rs. 3 a cubic yard. The sub-contractor found his own timbering, and at this rate of Rs. 3 a cubic yard in a tunnel 297 yards long, working at six faces, made a profit of from Rs. 6,000 to 7,000 and cleared himself of a loss he had sustained in taking out a rock cutting of 45,000 cubic yards at 10½ annas per yard. Wood too required for timbering will cost nothing here but the felling.

312. Your tunnel near Kárwár, 213 yards in length, will be through gneiss, will it not ?

I can't say. I have not yet got details of borings.

313. What description of block-in-course in arches do you propose to adopt ?

Chisel-dressed stones.

314. What length of period in your opinion will be required to construct the railway ?

I calculate it will take four years to complete the ghaut, and though other portions may be finished earlier, the through system will not be finished under four years. Portions of the line may be in use before the through system is completed.

315. How do you think the construction could best be divided yearly as regards the English and Indian cost ?

Till the conditions on which the contract is let, and the extent and date of the home indents are known, it is exceedingly difficult to form even an approximate estimate of what the yearly proportion will be. But in my opinion Indian and English expenditure should advance proportionately so as to enable parts of the line to be utilized for the conveyance of materials during construction, and the home indents should be regulated on this principle. I have known on the G. I. P. R. rails and iron-work carried for 300 miles at six annas a ton a mile, when if the masonry and earthwork (Indian expenditure) had been utilized by the laying of the permanent-way and the erection of girders (permanent-way and girders being English expenditure) materials could have been brought by train at less than quarter the cost. The whole cost of the electric telegraph should fall on the first year.

316. The price of iron has risen since the estimate was made, has it not ?

Yes it has.

317. At what price would you be inclined to rate iron work now ?

I would not alter it, because advices have been received from home of a material fall in the price with a declining market.

318. What is your rate for sleepers ?

1½ Rupees each delivered all along the line.

319. From what source will they be supplied ?

From the Forest Department. The Conservator has engaged to supply the whole line at this rate.

320. Has any allowance been made in the estimates for the cost of preliminary operations and survey ?

No.

321. Is it included in contingencies ?

No.

322. Do the estimates provide for houses for the staff?

No. On the G. I. P. Railway the system was to make a certain allowance for tentage, and the men were expected to house themselves.

323. Do you think that houses for the staff must eventually be built ?

There are advantages and disadvantages in the system of building houses for the staff.

324. Do the estimates include anything for repairing shops or machinery ?

No, hardly any machinery will be required, inasmuch as all the articles would be supplied from some general depôt for State Railways, and there will be no local construction of wagons and carriages. The running sheds as designed, and the workshops of the Executive

Engineer at Kárwár adjacent to the line, are quite capable of being used as repairing shops, and the whole machinery required for repairs would be a few fitter's vices, smith's tools and furnaces, a common turning and a screw-cutting lathe.

335. Where would the rolling stock be erected?
I should think in Kárwár, in the Executive Engineer's yard.

326. Do you consider that sufficient provision for station and watering accommodation has been made in the estimates?
I do, until we know what the development of traffic will be.

327. Are the stations merely temporary, built for a minimum traffic?
They are designed with a view to being enlarged if traffic developes itself.

328. Are they large enough to provide for Colonel Trevor's traffic?
The accommodation was arranged with the late Consulting Engineer for Railways, but I am not able to say if the accommodation is sufficient for a traffic of 85,000 tons.

329. Do you consider the sidings provided in the revised estimate sufficient?
I think the length of sidings mentioned in Mr. Molesworth's report on the Kárwár line had better be adopted. This will make an increase of siding at each of the 10 small stations of 100 yards. I would also make an increase at end of the station at Kárwár, Hubli, and Gadak of 220 yards, making a total increase of 1,660 yards of siding or 11 a mile. I think this would be sufficient.

330. Even at the larger stations?
Yes. If eventually they are found insufficient they can easily be lengthened at small expense.

331. Is there any item in the estimates for clearing jungle, including approaches from the main road?
No, but I consider that the contingencies should cover such a small item, especially as contingencies are taken at the high rate of 15 per cent. in place of 10 per cent. usually charged.

332. Do you consider your estimates cover any uncertainty regarding the foundations which are mentioned by Mr. Molesworth?
I do.

333. In framing your estimates have you borne in mind the position of the Kárwár Railway in regard to the nature of the country traversed, and to the climate?
Certainly.

334. During what months do you propose to carry on the works?
On Nos. 1 and 2 districts from the end of the rains to the commencement of the rains. On Nos. 3½ and 4, in the jungle portion, from December to the rains. On the rest of the line the work can be carried on the whole year.

335. What is your opinion of the effect of a large importation of labour upon current rates of work?
I think labour would probably rise, and my rates allow for it.

336. Would the fact that contractors are willing and ready to tender for the railway works at the prices given in the Estimates be any proof, or guarantee, that the line will be constructed for the estimated amount?
Yes.

337. To what extent?
With a good Engineer, a good contractor, good superintendence and strict specifications, the 15 per cent. added for contingencies would ensure the line being constructed within the estimated amount.

338. Is there any provision for medical attendance and medical stores in your estimate?
No there is not, but contractors are always expected to supply this to the people.

339. What do you mean by local labour?
Labour adjacent to the line.

340. Is there not abundance of labour procurable in the adjacent districts, namely in the Goa territory and Kundapur talooka, distant by sea but a few hours journey, and have not these districts been the main source of supply when any large call for labour has occurred in North Kanara?
Yes. I have also had an offer from Messrs. Britto of Mangalore, South Kanara, large Government contractors, to supply two thousand labourers.

341. Is not your estimated rate for labour, for the whole of the works, higher than the rates now prevalent?
Allowance has been made in the estimates for labour rising in price.

342. What are the present rates for coolies in the districts along the line?

On No. 1 district 4 to 4½ annas.
„ 2 „ 4 to 5 „
„ 3 to 4½ „ 5 to 6 „ to Devicope.
„ 4½ to 5 „ 3 to 4 „

343. How do these rates compare with your estimated rates?

Taking what a coolie will do in a day, that is a yard and a half, the estimated rates have been fixed to give a margin of profit to contractors, and to allow for the settlement of banks during the rains.

344. Then is your rate an average rate for four years?

Yes.

345. Your rate for iron-work is £7-10 a ton, how would a rate of £8-10 affect your estimate?

About £8,800.

346. You have before stated that improvements in the location of the line are feasible. Can you give any approximate statement of the effect these improvements may have on your estimate?

I expect the improved deviations will result in a saving of £12,000.

347. Have you made surveys from Gadak to Bellary?

Yes.

348. Speaking in a railway sense, is it an easy or difficult country?

An undulatory country, that with a gradient of 1 in 100 an easy section can be made.

349. Any large bridges on this line?

Yes, one large one over the Tungabudra.

350. What are the principal places through which the line to Bellary would pass?

Gopal, Hospett, Dharajee and so into Bellary. This is the direct line, and runs partly through the Nizam's country.

351. There is an alternative line, is there not?

Yes, from Gadak to Dumul, crosses the Tungabudra, and from thence it will meet the line abovementioned at Hospett. Most of this line is in British territory.

352. Have you formed any opinion of the length and mileage cost of each of the lines you have mentioned?

I have only formed an opinion of the cost of the direct line from Gadak to Bellary. This line would cost about £4,000 to £4,500 a mile, the length being about 87 miles.

353. Have you surveyed towards Bunkapur from Hubli?

No.

354. Have you surveyed for a line towards Sholapur?

Yes.

355. What is the nature of the country so far as you have gone?

The survey has reached Bagalcote, and the section is easy so far. The ruling gradient adopted is 1 in 100.

MAJOR GREIG, R.E., *examined.*

30th September 1872.

356. Are you well acquainted with Kanara and its resources as respects the execution of public engineering works?

I was there, Executive Engineer, for rather more than two years, and know the district well.

357. What building stone is available between Kárwár and the bottom of the ghaut?

There is very good granite from Kárwár for 30 miles. Beyond that there is a very tough stone, a basaltic stone.

358. What is the nature of the stone on the ghauts?

Schist of good character for building, and this is met with up to Kirwutty.

359. Is the lead for stone below ghauts considerable?

As laterite is not to be used on bridges and culverts, I should say the lead for the stone will be considerable.

360. Did you ever use the stone found in the beds of the rivers between Soonksal and Arbyle?

I tried to use it, but the Chinese masons even could not dress it with the chisel.

361. Would it make good rubble masonry?

First rate I think.

362. Do you think you would be able to build the piers and abutments of culverts and bridges below ghauts with the granite and stone you have mentioned, merely hammer-dressing the stone, and having no coigns or facing ?

I might do it, but I would rather not, because of the joints being too large, and the mortar not being good.

363. Can you hammer-dress granite, and this basaltic stone, to an angle ?

No, I think not.

364. Granite is quarried in two ways, is it not ?

Yes. It is blasted out with gunpowder, or split with wedges out of boulders, into blocks of any size.

365. What would be the rate in your opinion of rubble masonry in piers and abutments built of the split blocks of stone you have mentioned, no coigns or facing stones being used ?

If built with wedge split stones, which would obviate the necessity of having coigns or facing stones, the rate would probably be about Rs. 20 a yard. Beyond Soonksal, the stone wont split with wedges, and the rubble hammer-dressed would be very rough and probably unsafe in piers and abutments. I tried to put this stone with the starlings of wooden bridges between Soonksal and Arbyle and failed. I could make nothing of it, even with Chinamen and their large chisels.

366. What natural limestone will be available for the Railway works between Yellapur and the sea ?

Lime can be made from shells and from kunkur found at Kulgutghee.

367. What will be the lead of lime?

The lead will be on an average, great.

368. Do you consider shell-lime suitable for railway works ?

No. I would not use shell-lime for bridges of culverts or works of that description.

369. Would you use it for arching ?

No.

370. Do you consider the rates taken for the railway works to be full and sufficient ?

No. I think the rate for embankment should be 5 annas a yard where the coolie costs 4 annas a day. I think the proportion should not be 4 annas to 6 annas for earthwork, but 5 annas to 8 annas. I have paid 11 annas nearly a yard, and then the work dragged.

371. What rate of daily wages would correspond with the 11 annas a yard ?

Taking the task per day at 1 yard, with high embankments, and under difficulties of management in the Kárwár jungles, and allowing 20 per cent. for contractors, establishments, tools, and profits, the daily wages per man is Rs. 0-8-8.

372. Have you anything to say to other rates besides earthwork?

Yes. I consider cutting is more expensive than embankment. The rate in my opinion should be $5\frac{5}{8}$ to $9\frac{1}{3}$ annas per yard.

Rock should be	2·7 to 4	Rs. per yard.
Laterite do.	1·3 to 2·7	„
Moorum	·7 to 1·3	„
Broken-stone ballast	2·7 to 4	„
Laterite masonry	8 to 10·8	„
Rubble masonry in culverts and bridges.	10·8 to 16	„
Lining in tunnel.....	25 to 35	„
Concrete	5·4 to 8	„
Timber (cost me) in bridges	$4\frac{1}{4}$	Rs. per foot.

Pitching dry sea wall 8 annas a cubic foot. The other rates in the list I consider full and ample, but the rates I have given refer to the country from Dharwar to Kirwutty. I am under the impression, however, that the use of the fine sea sand in ballast will not be desirable and should be avoided.

373. What, in your opinion, will be the effect of the importation of a large amount of labour for the railway works in Kanara as respects wages ?

I think coolie wages may rise to 8 annas a man in certain unhealthy portions of the country.

374. You have been speaking from your personal experience of Kanara. Of how far back were you speaking?

From two to four years back.

375. Are not the rates you have given for earthwork derived from your local experience?

No, not entirely from Kanara experience. They are based on what I know of rates in other places.

376. Are not they based on the rates prevailing when you were in Kanara?
Yes, to a great extent.

377. Would not rates be affected by the price of grain?
Yes.

378. Are you aware that a large fall in the price of grain has occurred in Kanara since the last three years?
No, I was not aware of it.

379. What did you ordinarily pay for coolies?
4, 5, and 6 annas.
4 annas from Kárwár to end of Ugsoor ghaut; from there half way to Soonksal 5 annas. The rest of the way to Kirwutty 6 annas.

380. Have you generally worked by general labour, or by contract?
By both.

381. Would the rate you paid for daily labour materially effect the contract prices?
Yes.

382. Were your contracts sublet or not?
I arranged they should not be sublet, but I believe they were.

383. Do you believe they were ever sublet twice over?
They may have been, but I can't say.

384. Do you remember the metal contract from Kárwár to Arbyle?
I am not aware of it.

385. Was your labour generally local, or did the people come from some distance to your works?
Partly local, and partly imported.

386. Did you make any special provision to feed your imported labour?
No.

387. Did you make any provision to shelter your men, or to afford them medical aid?
Yes. I built sheds for them, and provided medical attendance and medicine.

388. At what periods did you pay your daily labour?
Once a fortnight, besides giving advances.

389. Were they regularly paid?
Yes, once a fortnight in the jungles, and once a month on the coast.

390. Have you never known men unpaid for upwards of a month without any fault on their part?
I have known it occur on the Sircy road.

391. Do you look upon the case on the Sircy road as altogether exceptional?
It was unusual, and against my practice.

1st October 1872.

392. Were you generally satisfied with the class of contractors you obtained for work conducted under you when you were Executive Engineer in Kanara?
No, very much dissatisfied.

393. Is it not a fact, that all the works hitherto carried out in Kanara have been expensive beyond all previous experience?
Beyond all my previous experience.

394. To what cause do you ascribe this?
I ascribe it chiefly to the unhealthiness of the climate which makes people reluctant to go there; secondly, to the manner in which the work people were treated by the contractors, defrauding them out of their wages. In my opinion cashiers did the same thing.

395. Are you aware that the unhealthiness of the district has been materially on the decrease during the last three or four years?

I speak of two years ago, and as far as I know it was not on the decrease. I can say that at one time I myself was incapacitated from fever, also Lieutenant Reynolds, also Sergeant Reany, also two sub-overseers—in fact, the whole superintending establishment on the unfinished portion of the Arbyle ghaut road.

396. Would not the cheating of the labourers you have mentioned have the effect of deterring labourers from resorting to the district; and would it not also tend to raise the nominal rate of wages?
Yes, certainly. I wrote to the Executive Engineer, Ratnagiri, asking him to send me at least 500 labourers, and he replied there would be difficulty about it, because, although they dreaded the climate, they feared the contractors more, who had been in the habit of not paying for the labour they employed.

397. Had you any other difficulties affecting the cost of labour besides those you have mentioned?

The sudden suspension of work ordered by the Government of India in January 1870 upset my arrangements.

398. Was this prohibition applied to other districts besides Kanara?

Yes. It was general, but it had greater effect in Kanara than in most other districts, because we had to import our labour into the jungles which were almost without inhabitants.

399. Referring to your answer to question No. 388, had your assistants power to pay their work people as often as they thought desirable?

Yes.

400. Even daily?

Yes, and to give any advances they liked.

401. What was the reason why you and your assistants fixed upon fortnightly and monthly payments?

As being convenient seasons to us, and to the people themselves.

402. Are you of opinion that more frequent payments would entail loss upon the work people?

Yes, because the people lose half a day each day they are paid. My opinion is, the work people prefer being paid once a month if they are paid by officers, and trustworthy people, to being paid oftener by cashiers and carkoons.

403. Do you consider Kárwár harbour affords shelter to shipping, moored or riding at anchor, from those points of the compass from which storms and heavy seas are accustomed to occur?

Yes, from which storms are accustomed to occur, but not from those points from which storms may occur, for instance from West 15° North, and beyond that to the North-West. For example, one monsoon the ship *Mahabuleshwur* was in great danger, so much so, she put out in a heavy storm of wind under tow of a steamer. The storm was so bad both the towing cables parted. She put out because the Captain said she was bumping, and lost part of her false keel. She anchored under lee of the Oyster Rocks.

404. Have you ever known a gale from the West?

I believe the gale mentioned above came from the West, but I cannot say positively.

405. Can you say how near the cove the sea swell came?

There were heavy breakers off the Collector's Kutcherry.

406. Did you at that time think the Government buildings, the Kutcherry, and Judge's house were in danger?

I don't recollect it was at that time, but I once thought those buildings were in great danger.

407. What were the causes and effects which led you to consider the Government buildings in danger?

Heavy breakers washed away the sand in large masses. I reported this. It happened during the South-West monsoon.

408. Do you think the port of Kárwár could be improved?

Yes.

409. Are you acquainted with the nature of the protective works which have been proposed for the improvement of the port of Kárwár?

I am acquainted with two principal schemes, and one minor one. One scheme consists of the construction of a breakwater thrown out from Kárwár Head, and a wharf in 22 feet L. W. S. along side, and including fisherman's rock. The breakwater, with a gap between it and the wharf. The second scheme is the dredging out of the cove to make it a deep-water tidal-basin with wharves for ships to come alongside at L. W. S. tides. A minor scheme, common to both, is a groyne to keep the Khala Nuddee in its present channel.

410. Have you formed any opinion yourself with respect to these schemes?

My opinion is in favour of the breakwater with a wharf.

411. Will you explain why you prefer this project?

My chief reason for preferring the breakwater project is, that it is a safe project offering equal advantages with any other scheme, and making a large extent of harbour very safe. The only objection I have heard to this project is, that it would on account of its position cause a considerable deposit of silt off the wharf itself. To obviate this, I would provide a space in which the silt could be deposited between the breakwater and the wharf, and also an arched opening in the breakwater itself, adjoining the shore, through which the silt might escape. I have observed during two years the deposit of silt and mud in the Beitcul cove, which is a miniature harbour; and I consider, that in the dry season there is a considerable deposit thrown up on the beach at the end of the cove. In the wet season the rains sweep

away this deposit, so that from one year to another there is no variation in the harbour. And I consider, that this same natural arrangement would take place in the open space between the proposed breakwater and the wharf. As respects the other project for dredging out the cove, I am of opinion it is an uncertain and unlikely project. I should be afraid that in the soft mud (and the even bed of the bottom of Kárwár harbour seems to show that mud is evenly distributed all over it) any cut made would be filled, probably quickly. Another reason why I do not prefer the cove project is, that its area would be so circumscribed on account of the rocky nature of the bottom near the shore, that its capacity would be very limited in comparison with the breakwater scheme. I also say that the basin is not capable of extension towards the shore end of the cove, because laterite is, I think, met with there. In support of my opinion that a cut in the harbour would fill up, I would refer to my opinion about the action of the silt which is deposited in one season and washed away in another, both of which actions would have the effect of filling up any trench in the harbour.

412. What is your opinion of the screw pile and sloping stone wharves which have been proposed in the project and estimates before the Committee?

I consider, that the continuous wharf wall resting on a sloping base of soft mud would probably slip, and that the iron part of the wharf itself, and stages, is too slight in construction. And also, that the scheme of screw piles will not answer if the bed is rocky.

413. Have you made any soundings yourself in the cove?

I have, and I believe there is rock below at about 10 feet below low water, eight feet of mud and two of water, alongside the existing wharf wall.

414. Was this in many places?

Yes all along, though at varying depths.

415. Where did you find the laterite?

There is plenty at Beitcul, and as far as I know it extends into the cove.

416. At what depth below water?

I can't say. I made soundings, but I don't remember.

417. What length of breakwater would you recommend?

A thousand yards.

418. Suppose careful soundings were to be made in and around Beitcul cove enabling an Engineer to estimate with considerable accuracy the probable cost of constructing wharves and jetties in the cove, do you think that even then the feasibility of the scheme for making a tidal-basin in the cove could be reduced to any amount of certainty?

I think not on account of the dredging. I think the channel and dock would fill up.

419. Why do you think protection is necessary at the mouth of the Khala Nuddee river to prevent it flowing into the bay?

To prevent it debouching into the bay, and so depositing silt there, and thus injuring the harbour.

420. Is it the fact that the river at some previous time opened into the bay to the south of Connaghur that it left that mouth and opened again to the northward?

I have heard it opened to the south of Connaghur, and I know it now opens northward.

421. In the event of the river forming an opening to the southward of Connaghur in an exceptional monsoon, the S. W. monsoon would throw back the silt brought down by that new mouth, and again reconstruct the bar, throwing the river back into its old or northerly course. Is this the case?

I think so, though the process might be gradual. I think the river (the Khala Nuddee) is the danger of Kárwár, and the mouth should in any case be kept to the north.

422. Who was in charge of the port when the *Mahabuleshwur* got into the difficulty you spoke of, and who was in charge of the ship when she left her anchorage?

Mr. Ingle was the Port Officer, and the ship was in charge of the Captain.

423. Had Mr. Ingle any nautical experience?

None that I have heard of. Mr. Ingle, the Deputy Collector and Superintendent of Kárwár, was Acting Port Officer, during the Port Officer's absence.

424. You stated that at one time you thought the Government buildings were in great danger from the breaking of the sea. Practically has any actual damage whatever occurred to them from that cause, either at the time you speak of or since?

No damage occurred to the buildings at the time, and to prevent future encroachment by the sea, the beach was pitched with heavy stones.

425. Have you ever seen any laterite at the bottom of the cove?

No I have not seen it, the end of the cove is covered with mud.

426. In what part of the cove would you expect to find laterite under the mud?

At the shore end of it.

MR. FORDE *recalled and further examined.*

19th October 1872.

427. The President has sent you an approximate estimate of annual traffic which the Committee think might be obtained by the Kárwár Railway within the first three years of its opening. Can you give the Committee your opinion as to the proportion of the Revenue from that traffic which would be absorbed by the working expenses, assuming the wood fuel to cost Rs. 4 per ton?

I have prepared a statement which I hand in, based on my opinion as to what the inequality of the traffic might be, and I put the total working cost at Rs. 4,35,462, being at the rate of about 44 per cent. of the receipts.

428. Do you wish the estimate of working expenses of a higher traffic, which you handed in at the last meeting, to remain as well as this estimate?

I would prefer that both should remain.

429. Does your present estimate of the working assume that not less than one train per diem each way could be run throughout the year?

Yes—supplemented by specials as necessary.

430. How do you propose that the ghauts should be worked?

By additional bank engines.

431. Have you seen Mr. Molesworth's figures as to the load on inclines which the heavy type of engines ordered for the State Railways will take—the figures are in Mr. Molesworth's last annual report?

Yes, and I notice that they will haul approximately 27 vehicles up 1 in 100, and 13 vehicles or about half up 1 in 40, therefore, as the traffic in both directions is about equal, with the aid of a bank engine up the 1 in 40, an equal load can be carried to that by one engine up 1 in 100.

432. In your former evidence (Question 66) you gave an approximate estimate of the rolling-stock which you deemed necessary. Have you, on the estimate of probable traffic, which you have now been considering, any alteration to make in that estimate?

I would reduce the number of engines to 16, but I would not alter the number of carriages or wagons.

433. In the number of 16 engines what proportion do you allow as in shed or under repair?

About one-third.

434. What do you thus estimate as the approximate engine mileage per annum?

About 12,000 miles for each of the 16 engines, which I deem small duty per engine, but in consequence of there being so many trains during the months of March, April, and May, I have allowed more than the average number of engines for a gross engine mileage of 188,415.

435. In the former estimates for construction and one year's maintenance, which in your previous examination you said you approved, the first year's maintenance is entered at the rate of Rs. 1,584 per mile, but in your present estimates you put the maintenance at the lower rate of Rs. 937 per mile. How do you explain the difference?

By the fact that the first year's maintenance is always in excess of the average of later years. The ballasting for instance, in consequence of the greater sinkage of banks during the first year, forms a large item and thus necessarily involves more labour on the permanent-way.

436. In your present estimate of working expenses, the locomotive and rolling-stock outlay is put at about 12½ per cent. of the receipts, according to the returns which I place before you. It seems that on the G. I. P., B. B. and C. I., Madras and Great Southern of India Railways, the locomotive and rolling-stock expenditure during the two years 1870 and 1871 averaged speaking generally about double that proportion of the receipts?

First, the average rate for carriage of goods is nearly two annas per ton per mile in the Kárwár Railway, whereas that on Indian lines is about 1¼ annas, this would at once reduce the percentage, if worked at similar rates, to 15 per cent. of gross receipts. The cheap wood fuel would also give a very large reduction, and the reduction in dead weight would lower it still more, so that 12½ per cent. seems a fair rate.

MR. LEMESURIER *recalled and further examined.*

19th October 1872.

437. Referring back to question No. 14 and your answer thereto, supposing that the Wudwan Line started as it does from Saburmattee, that it was laid on the 3′ 3″ gauge with 36 lbs. rails, instead of on the 5′ 6″ gauge with 60 lbs. rails, that the nature and relative prices

of the materials were the same for the two guages, and that the materials were carried to the spot over the B. B. and C. I. Railway, what saving in the cost of construction do you estimate would have resulted from the narrow gauge?

By the answer to question 14, the saving under the circumstances there named was estimated to be, cost of carriage Rs. 4,000, and on cost of material Rs. 8,000, total Rs. 12,000 per mile. Under the conditions now specified the saving would be reduced to one-third the cost of carriage, or Rs. 1,333, and would be the same on cost of materials Rs. 8,000, total about Rs. 9,333 per mile.

438. Supposing the same as in the preceding Question No. 437, but that the railway was laid upon the 5′ 6′ gauge with 45 lbs. rails. What saving in the cost of construction do you estimate would have resulted from the narrow gauge?

Assuming the whole road to be lighter in proportion, the saving would be approximately on cost of carriage Rs. 1,000, and on materials Rs. 6,000, total about Rs. 7,000 per mile.

439. You have been considering Mr. Shaw's revised estimate, will you state your opinion on the question of rates?

As I have said in my evidence, I consider that the rates quoted in the estimates are good rates, *i.e.*, that they are high as compared with rates elsewhere, but gauged by the standard of wages now ruling in the country through which the railway passes—they are *bare* rates; for any subsequent rise upon which rates no provision would appear to have been made. We have no experience in this country to lead to the conclusion that rates will not rise as work proceeds. The contrary has been universally the case, and *under troublesome conditions* the rates have been known to increase not moderately but two and threefold, and to keep at that higher figure so long as pressure of work lasted. By *troublesome conditions*, I mean, for instance, heavy earthworks in a country not well spoken of as healthy, where the "air and water" do not come up to the coolie's standard, whatever that may be. A continuous jungle, the possibility of bad epidemics, the occurrence of which is disastrous, high banks and deep cuttings, rough ground where earthwork is not plain straight-forward digging, and basket work, &c.; it may be possible to arrange so as to do as little lifting as possible in the earthwork, and to run cuttings into banks, but this again involves the item of "extra lead." The banks, on the ghâut sections at least, are high banks, and these are always very costly to finish.

I have expressed no opinion as to whether the masonry as specified could be built at the rates, because I have not seen the specification, but under fairly favourable conditions a sufficiently good class of work can now be done for the rates quoted on our South-East Line, if no great pressure is necessary as to time. Increase to rates, I allow to be met by reduction in quantities. The masonry in bridges and culverts is estimated at Rs. 7,51,574, and my remarks as to rates apply equally to masonry as to earthwork. The total earthwork and masonry in banks, cuttings, bridges and culverts, would thus appear to be Rs. 23,42,739, Rs. 16,212 per mile, or 15 per cent. Rs. 18,643.

440. I put into your hand a paper showing the contract rates paid in 1870 on the G. I. P. on the Nagpur Branch and North-East Line beyond Bhosawal, for earthwork in embankment or cutting, and for coolie labour, are you of opinion that these figures fairly represent the average proportion between rates of labour and rates at which work ought to be done?

Contract Rates on Contracts 13, 14, 15, 16, and 17, G. I. P. Railway for earthwork and labour:—

		Contract No.				
		13	14	15	16	17
		As.	As.	As.	As.	As.
Earthwork in embankment and cutting per cubic yard	Black Soil	4	4	3½	4	3
	Moorum...	8	8	8	0	4
Labour — Men		6	5½	5	5	3
Labour — Women...		3½	3	3	3	2
Labour — Children		2	2½	2	2	1

Looking at the paper cursorily, and understanding that the rates for earthwork and labour therein quoted are taken from contractor's schedules, I should think it would be fair to assume that the proportion between labour and rates for work might be accepted, for work of an ordinary character, the more so as the contractors who framed the tenders from which these rates are quoted, have probably taken the coolies' wages as the basis of their calculation.

441. Adverting to Mr. Shaw's revised estimate, will you state your opinion as to the sufficiency of the quantities?

The exceptionally heavy rain-fall would surely necessitate the moving of a large percentage more of earth, than would ever appear in the net contents of the finished banks. Again, the quantity of work to be done when once ground is broken on these treacherous hill

sides with ghaut rain-fall cannot now be estimated by plan and section. It must represent a *very heavy* contingency. For this reason too, road and river diversions appear to me to be put at a low figure. With the masonry for bridges and culverts where the foundations are good, the quantities can be arrived at, but the amount of protective works, retaining walls, &c., through the ghauts is not so easily computed, and will, I think, be heavy. The total earthwork on the five divisions, if I read the figures rightly, is estimated to cost Rs. 15,91,159, taking the cheaper as to earthwork or high level line.

442. What is your opinion as to the expediency of further examination of the ghaut?

The result of the survey operations so far as they have gone, incline me to the opinion that such saving in the quantities of the work to be done might be effected by further examination of the rough ground as would enable the Engineers to lay out a line which, including contingencies, could be constructed as far as the masonry and earthwork are concerned for Rs. 18,643 per mile or say for Rs. 27,00,000 divided over four years in time.

443. What is your opinion as to the rates and quantites of ballast and timber?

I would not alter them.

444. What is your opinion as to the price of the iron-work?

I am afraid it will be necessary to add largely to the prices for the iron-work, indeed in the present position of the iron market at home it would not be safe to add less than 25 per cent. on the prices quoted in Mr. Shaw's estimate, this amounts in round figures to Rs. 28,400 on iron-work in girders, screw piles, &c., and to Rs. 2,77,765 on cost of the permanent-way, say three lakhs on the iron at a low estimate.

445. What is your opinion as to the sidings, stations, and buildings?

I would say of the stations (the plans of which I have not seen in detail, although I have seen the standard plans for the State Railway stations generally) that the accommodation provided for the Kárwár Line appears to me to be of the very scantiest nature both in the matter of station buildings, shedding, workshops and conveniences for traffic. More sidings will, I think, be required if any traffic is to be worked conveniently, and altogether an important addition should be made to the item for stations before the line can be considered as ready for traffic. With fair traffic this line will require 20 miles of sidings.

It will be necessary to house the staff comfortably, even if in temporary structures, at first, and to provide for clearing jungle, making roads, wells, dispensaries and hospitals of some kind. I would be inclined to estimate this in the first instance at perhaps Rs. 50,000 for all the staff, but this sum would have to be at least quadrupled afterwards.

446. What is your opinion with regard to the sleepers?

I have preferred to let the sleepers remain at Rs. 1½ each, leaving to the Committee to add to this should they think, as I do, that in busy times the Forest Department might not be able to complete the supply at this rate, or to add for cost of carriage sleepers landed at Kárwár, as the case may be.

447. With reference to your answer to Question 21, can you state the additions you would advise to Mr. Shaw's revised estimate of Rs. 72,88,350?

Estimate.

As by Mr. Shaw	Rs.	72,88,350
Add cost of preliminary surveys and interest thereon up to commencement of work say	„	4,00,000
Addition to cost of iron	„	3,00,000
Housing Staff	„	50,000

Rolling-Stock.

30 Engines at £2,000	=	£60,000
1st and 2nd Class Carriages		£15,000
20 Brakes at £250	=	£5,000
Wagons 500 at £100	=	£50,000
		£130,000

or, say, Rs. 9,000 a mile

Total Stock... 13,00,000

I have omitted all exchange. Total Rs. 93,38,350

Add extras for stations, 1st year's maintenance, &c., and the estimate will be very little short of £1,000,000 for the 144½ miles in actual outlay. Divide this outlay evenly over four years, and assume that from the day it is finished all further calls for interest cease, even then, there is a further charge for interest of from £75,000 to £100,000 according to the duration of the construction, or in all from £1,075 to £1,100,000.

448. Can you state your opinion generally as to the working expenses?

It must be remembered in dealing with the traffic and working expenses, that of the traffic towards the coast which must be nearly all traffic for export, almost the whole of it must move during the eight good months, and that it will not flow evenly during these eight months, but on the contrary very irregularly. That the traffic up the ghauts will probably not be one-third of that to the port, at least this is my opinion. *That none of the merchandise going inland can go right or left of the line until the summit of the ghauts has been attained,* this diminishes the area of territory which would be served by the railway very materially. We know how variable seasons in this country affect such traffic as would be imported *viâ* Kárwár—these and other difficulties in the matter of traffic will affect the numbers and consequent cost of the rolling-stock, and increase the proportion of working expenses, even though fuel be supplied from the jungles at a cost equal to twelve rupees per ton of good coal.

Of the effect which the railway may have on the Salt revenue and of the amount of Salt traffic under the disavantage of the Goa frontier stretching north, I am not in a position to express an opinion.

449. The President has sent you an approximate estimate of annual traffic which the Committee think might be obtained by the Kárwár Railway within the first three years of its opening. Can you give the Committee your opinion as to the proportion of the revenue from that traffic which would be absorbed by the working expenses, assuming the wood fuel to cost Rs. 4 per ton?

I do not consider that the working expenses will be less than 66 per cent. of the receipts, the maintenance of a ghaut line under monsoon influences being necessarily heavy.

450. Can you state your opinion on the question of ghaut working of the Kárwár Railway?

The experience derived from the G. I. P. Railway is only partially applicable to the Kárwár Line, inasmuch as Mr. Molesworth points very strongly to improvements in the system of ghaut traffic working, for which the grading and careful laying out of the work will no doubt give facilities; but these advantages cannot counterbalance the irregularities of traffic, *however* much they may admit of economy in dealing with such traffic.

451. Can you state your opinion as to the probable annual cost of maintenance?

For the first two years you must be prepared to accept a heavy maintenance rate for earthwork and ballast, of course the rails and sleepers ought not to require renewal for some time, and it will be some years before the cost of maintenance comes to a regular average. By comparison with other works of which I have a knowledge, I might roughly estimate the outlay for earthwork and ballast during the first two years at Rs. 1,60,000 for the whole line or Rs. 150 a mile a month, but if a large quantity of ballast is to be added, which will depend very much on the nature of the material of which the banks are made, and the manner in which it is thrown together, an addition must be made to the above estimate to provide for it. When the line has fairly settled and about two years' traffic has passed over it, then perhaps Rs. 75 a mile a month should maintain earthwork, ballast and masonry, exclusive of permanent-way materials or repairs to buildings.

452. In stating that you consider that the working expenses will amount to 66 per cent. of the receipts, have you taken into account the low speed of 15 miles an hour which is to be the maximum?

The 15 miles an hour maximum speed will in some instances modify the figures I have quoted, the bulk of my former answers were given without that proviso; 15 miles an hour will not affect fixed charges, though it will lighten the coal bill, and the absolute wear and tear of stock and road.

453. The traffic on the Great Southern of India Railway during the year 1871 amounted to about £425 per mile. The assumed estimate of traffic on which these questions have been based on the Kárwár Line is about £675 per mile per annum. The Great Southern of India Railway worked at about 55 per cent. of the receipts during 1871. Can you assign a reason for placing the percentage, the working expenses on the Kárwár Line will be as to the receipts at so much higher a figure (*viz.*, 66 per cent.)?

I have no knowledge of the working of the Great Southern of India Railway.

454. Are you aware that with the exception of the Sind, Punjab and Delhi Company Lines and the Oudh and Rohilkund Lines 66 per cent. is a higher percentage than the working expenses have borne to the receipts on any guaranteed Indian Railway in the year ending 31st December 1871?

The Kárwár Railway is a very exceptional line, both geographically as to its position with regard to traffic, the exceptionally heavy monsoon rain-fall, and engineering features. As long as it remains isolated and unconnected with other Indian Railways, I don't think its prospects are brilliant, the mileage and traffic over which the fixed charges have to be distributed are very small.

455. In your answer to Question No. 447 you have estimated 30 engines as required for working the assumed traffic on the Kárwár Railway, what proportion should you allow as in shed or under repair?

I consider that 25 would be usually in working order, and perhaps one in five of these would be always in shed.

456. Have you formed any estimate of the approximate engine mileage per annum which might be run by a Locomotive on the Kárwár Railway?

No. I do not think my experience with broad-gauge engines justifies my giving a deliberate opinion as to the probable performance of the narrow-gauge engines about to be introduced, my estimate of the stock required has been based rather on information that I have collected from various sources supplemented by my own general knowledge, than on any elaborate calculation as to the actual work which may be expected from engines, which have not yet been subjected to a crucial test in the country, and so far as I have at present any means of arriving at a conclusion, I would prefer so to deal with the estimates instead of basing calculations on theories and data of the correctness of which I was not fairly satisfied.

457. I place in your hands statements showing results of working Indian Railways for the years 1870 and 1871, from which it appears that on the average and speaking roughly the Locomotive expenditure including running and repairing charges averaged 25 per cent. for the gross receipts on the G. I. P., the Madras, the B. B. and C. I., and the Great Southern of India Railways, do you consider that this proportion might be applied in the case of the Kárwár Line?

I should think that when the Kárwár Line settles to its average working, provided it continues an isolated railway, its percentage for Locomotive and rolling-stock outlay would incline to be rather higher than lower than the average on the Lines abovenamed.

458. Do you think goods can be carried at a lower or higher average cost on the narrow than on the broad gauge?

Speaking generally, I doubt if the narrow will prove the cheaper.

MR. MANUEL, *Partner in the Firm of* MESSRS. RALLI BROTHERS, *Merchants, examined.*

459. You have had some experience of the Bombay cotton trade?

I have been here five years.

460. For the last two years your firm has been the largest exporter of cotton from Bombay? 3rd November 1872.

Yes for 1871 and 1872.

461. Have you exported any cotton direct from Kárwár to Europe?

Yes, about 3,000 bales this year, all to Liverpool.

462. What is your opinion as to the quality of Saw-ginned Dharwar cotton?

Except in the Russian market, it is not considered a desirable class of cotton.

463. In what respects do you consider it an undesirable class of cotton?

It is difficult to sell, the spinners generally avoid it, there are only in the United Kingdom a very few who will now take it.

464. What do you estimate the average yearly Dharwar crop, *i. e.*, the cotton sold as Saw-ginned Dharwar?

It is difficult to estimate accurately, but I should put it at 100,000 to 125,000 bales.

465. What is the weight of each bale?

3 cwt. 28 lbs. net, with about 25 lbs. to 30 lbs. tare if iron bound; about 15 to 16 lbs. tare if bound by rope lashings.

466. Do you include Coompta cotton with Dharwar as regards your opinion of its quality?

The cotton sold as Coompta is different, and the spinners at home have not shown the same reluctance to use it as Dharwar. Lately, however, they have been more averse to Coompta cotton owing to the quantity of seed in it.

467. Do you include the Coompta cotton in your estimate of the quantity of Dharwar cotton?

No, it is difficult to ascertain the quantity of cotton sold as Coompta, as various districts produce similar cotton which is frequently mixed in Bombay and classed as Coompta.

468. To what country is the Dharwar cotton chiefly exported?

The greater proportion, more than half, finds its way to Russia either direct or *viâ* Liverpool, Trieste, or other channels; one-quarter would be a full estimate of the consumption in Great Britain.

469. Do you think the Russian demand for Dharwar cotton is likely to be maintained?

I am aware of no reason likely to cause it to fall off. Dharwar cotton appears to suit the machinery in Russia.

470. Do you think the direct shipments from Bombay to the Continent have increased of late?

Yes, very considerably, since the opening of the Suez Canal, which has enabled Foreign Steam Companies to form regular lines between Bombay and the Mediterranean and Black Sea.

471. Do you consider this change favorable to the development of the Indian cotton trade?

Yes, because it allows many Continental Countries to supply themselves with cotton comparatively cheaper than if they had to get it *viâ* Liverpool.

472. Are these direct shipments in English or Foreign vessels?

The shipments are chiefly by the regular lines of steamers, such as the P. and O., Austrian Lloyd's, Italian and Russian, when the shipments are intended for several ports, but when a full cargo is shipped direct, mostly English steamers are employed.

473. How do you think this change will affect the demand for Saw-ginned Dharwar in Russia?

I am unable to give a positive opinion, but I should think it will make little or no difference.

474. Are there not frequent complaints of the unevenness of the Saw-ginned Dharwar cotton?

Yes, more so than of any other quality of Western India cotton, as, beside the variation in the quality of the crop, it has also to suffer the defects caused by ginning, sometimes especially towards the latter end of the crop; the gins by being out of order through use completely ruin the staple.

475. Was the last season's crop superior to the average of preceding years?

Yes, owing to the staple being stronger, and the ginning more carefully done.

476. From what time did the improvement in ginning commence?

We first observed it with the new crop, which came into the market in the beginning of 1872.

477. Supposing the improvement in the ginning to be permanent, do you think the demand for Dharwar cotton will increase?

The demand may increase, when the Home spinners have sufficient confidence that the improvements will be continuous.

478. What would be the effect on the Indian cotton trade of an increased supply of American cotton in the Liverpool market?

I should say a curtailment of trade in Indian cotton, unless it could be sold at prices sufficiently low to attract attention.

479. What is your opinion as to the future of the Indian cotton trade?

I should say it is in a critical position, as we do not know to what extent the quantity of American cotton is capable of being increased, and the price at which it can be produced. At their comparative intrinsic value, spinners will certainly prefer American to Indian cotton.

480. Supposing cotton could be delivered from the Dharwar district on the G. I. P. Railway at the same price per ton as it could be by a Railway *viâ* Kárwár, by which route would you prefer to have it?

The advantage would be with the land route, as the safest and most to be depended upon as to punctuality in delivery at Bombay.

481. Can you specify the advantage?

It lies in the punctuality which would enable the merchant to fulfil his engagements, and especially during the four monsoon months.

482. Supposing cotton costs less by one-eighth of a penny per pound delivered in Bombay by the Kárwár route than carried by G. I. P. Railway, would that be sufficient to turn the balance in favor of the Kárwár route?

In ordinary circumstances yes, but if that would imply a long delay or uncertainty owing to the monsoon, the advantage would disappear.

483. Do you consider that much cotton will be shipped direct from Kárwár to a European port?

No, because the cotton not being largely used in England cannot be sent in full cargoes to Liverpool, and the continental ports will generally only take a small quantity at a time. It would rarely answer for a full cargo of the same description of cotton to be sent to one port direct, besides the freight from Kárwár is usually heavier than from Bombay, and it pays merchants to bring the cotton to Bombay and then take advantage of the facilities offered by the different lines of steamers. Occasionally a steamer will partly load in Bombay, and proceed to Kárwár to fill up, or will load altogether from Kárwár to a European port.

MR. MCILWRAITH, *Partner in the Firm of* W. NICOL & Co., *Merchants, examined.*

484. You have had some experience in the Bombay cotton trade?
Yes, since the year 1850.

485. Have you exported any cotton direct from Kárwár to a European port?
Yes, my firm has been the chief exporter.

486. Can you state the European ports to which you have exported cotton direct from Kárwár?
Liverpool, Falmouth for orders, and Havre, and we have shipped Dharwar cotton *via* Bombay to Trieste and Odessa.

487. Can you give your opinion as to the quality of Saw-ginned Dharwar cotton?
As an Indian cotton, I have the highest opinion of it, if it receives fair treatment in preparation; and in corroboration of my view, I can mention cases in which during September and October this year, Saw-ginned Dharwar cotton, exported direct from Kárwár to Liverpool fetched prices 25 to 30 per cent. in excess of the official quotations for fair Dhollera at the time in Liverpool.

488. Did you hold a high opinion of Dharwar cotton for any time?
Yes, since the year 1862, and I formed it at that time in consequence of seeing 72 thread printing cloth manufactured from it and shown to me by Mr. Benjamin Ashton who had previously never manufactured from any but American cotton.

489. In what respect do you consider Dharwar cotton a superior cotton?
It is of a finer, longer and generally speaking stronger staple when properly ginned.

490. What were the prices per lb. mentioned in your answer to question 487?
Sales of superior Saw-ginned Dharwar were made on September 16th, 23rd, 30th, and October 10th at 8½*d.* on which days fair Dhollera was quoted officially at 6¾*d.* 6 7/16*d.*, 6 7/16*d.* and 6¾*d.* and fair Saw-ginned Dharwar at 6⅞ on 16th September, 6½*d.* on 28th September, and 6⅞ on 11th October. I consider that on these days best samples of Dhollera would not have realized above 7*d.* to 7¼*d.*, or about 19 per cent. less than the superior Saw-ginned Dharwar fetched.

491. At how much do you estimate the average yearly Dharwar cotton crop, *viz.*, the cotton sold as Saw-ginned Dharwar?
I should put it at 100,006 to 125,000 bales.

492. What is the weight of each bale?
3 cwt. 28 lbs. net weight excluding tare.

493. In your opinion of the quality of Saw-ginned Dharwar, do you include Coompta cotton?
I have a high opinion of Coompta cotton, especially for strength of staple.

494. Are you aware whether there has been any reluctance on the part of spinners at Home to use the Coompta cotton?
Only on account of the uncertainty as to the percentage of seed which it contains.

495. Do you consider the Coompta cotton is susceptible of improvement in preparation?
Yes, in sending it to market free from seed and other adulterations; and in exporting it before the monsoon, which causes black leaf and depreciation in working value.

496. You do not include the Coompta cotton in your estimate of the quantity of Saw-ginned Dharwar. Can you give any estimate of the quantity sold as Coompta?
It is difficult to say, but I would put the Coompta cotton approximately at 70,000 to 80,000 bales; it is more correct to call the Dharwar cotton exotic, and the Coompta indigenous.

497. Have you heard complaints of the quality or unevenness of the Saw-ginned Dharwar cotton?
Being general complaints, I attribute them to the saws not being in good order, and to the mixing in the saw gins of exotic and indigenous cotton, two very different species, requiring to be cleaned by different machinery, and to the absorption of moisture resulting from the detention of the cotton in the country during the rains.

498. Have you noticed any difference in last season's crop of Saw-ginned Dharwar?
Yes, there was more well-ginned cotton, and the season being favorable the crop itself was good.

499. Supposing that the gins are kept in fair order, do you think the demand for Saw-ginned Dharwar is likely to be maintained or to increase?
I think it will increase; it suffers at present from a prejudice pretty well-founded upon bad ginning, but I believe the intrinsic quality of both Saw-ginned Dharwar and Coompta to be so good, that if they were prepared under skilled European superintendence and exported before the rains they would speedily find favour with consumers.

500. Has not the Dharwar Saw-ginned cotton been largely exported to Russia?

Yes, during the American war the Russians commenced to buy largely; they have since been steady consumers, their machinery and hands being accustomed to it, as is the case with Oomrawuttee cotton in France. Dharwar cotton mixes well with American and with that obtained by Russia from the neighbourhood of Bhokhara.

501. Do you think the Russian demand is likely to be maintained or to increase?

I think it will increase, especially if the improvement in the preparation of the crop, which is so necessary, takes place.

502. Have the direct shipments of cotton from Bombay to Continental ports increased of late?

Largely, and may be expected to continue to increase.

503. Do you consider the increased Continental consumption favourable to the development of the Indian cotton trade?

Certainly.

504. What would be the effect on Indian cotton of an increased supply of American cotton in the Liverpool market?

Undoubtedly a decline in value.

505. Do you think generally that an increased supply of American cotton would affect the Continental demand for Indian cotton?

It would depend entirely upon the relative values established for the two descriptions of cotton. As regards the Mediterranean and Black Sea ports, Bombay, from its geographical position, could compete favourably; but the great question really is whether the production of cotton available for consumption in Europe is increasing in more rapid proportion than the consumption. From all that I have heard of the increase of spinning machinery, I believe not. Akin to this, is the immense increase of the internal consumption of cotton in America fostered by their protective duties; roughly speaking, it now requires nearly 7 million bales per annum to keep the spindles in America and Europe going. India also is becoming a greater competitor for cotton with exporters.

506. What is your opinion as to the future of the Indian cotton trade?

I entertain a favourable view of it, but I am conscious that many intermediaries (as we all are in Bombay) think differently. Competition, telegraphs, the Suez Canal, have all tended to reduce our profits and induce us to look with despondency upon the future. My opinion, however, is that the curtailment of our profits contributes directly to the increase of the trade, by reason of the higher prices paid to producers, and the more moderate rates paid by consumers. I also deem that the altered conditions of labour in America are favourable to the Indian cotton trade, because, if prices decline to a low point, the American grower will not voluntarily enter into optional contracts for hired labour, and the American supply will therefore adjust itself.

507. Do you consider that cotton will be shipped direct from Kárwár to Europe, *vid* Bombay?

With the concentration at Kárwár of the export trade of that part of the country, which would result from a railway, I believe the shipments would be almost invariably direct, the distribution of part cargoes taking place at Port Said.

508. In what shape is the cotton now transported from Dharwar to the coast?

In unpressed docras.

509. If a railway was made, do you think the cotton would continue to come to the coast in docras?

The cotton brought by European agency up-country would, I think, be full-pressed at the starting point, while that sent down by natives to the coast for sale would be in docras, as at present.

510. Has this been the result on the G. I. P. Railway?

Generally it has: the presses at Sholápur to Barsi have been little used because the cotton was sent to Bombay by natives, to be largely used in the local mills.

511. How do you estimate Saw-ginned Dharwar as compared with other descriptions of Indian Cotton, assuming that equal care is used in the preparation of all?

I would place it among the highest.

512. Do you think the Saw-ginned Dharwar is prepared as carefully as the other cottons of Western India?

No other cotton suffers so much in preparation as the Saw-ginned Dharwar.

MR. BICKERDIKE, *Partner in the Firm of* MESSRS. KNOOP & Co., *examined.*

5th November 1827.

513. You have had some experience of the Bombay cotton trade?
Yes, since January 1863.

514. Have you exported cotton from the Dharwar cotton field?
Yes; to Liverpool, Trieste, Odessa, and direct to Cronstadt.

515. Have you exported much Saw-ginned Dharwar cotton to Russia?
Yes; latterly we have sent more to Odessa than to the Baltic.

516. Have your shipments been direct from Kárwár, or *viâ* Bombay?
Part direct and part *viâ* Bombay.

517. Can you give us your opinion as to the quality of Dharwar Saw-ginned cotton?
My experience of it is that it is not a good style of marketable cotton, and it is only readily saleable when other classes of clean cotton are scarce.

518. In what respect do you entertain a low opinion of Dharwar Saw-ginned cotton?
Chiefly because the staple is injured in the preparation, and the cotton is adulterated with leaf and dirt.

519. How do you consider Saw-ginned Dharwar would compare with other Indian cotton if properly prepared?
I think it would be superior to Broach and only inferior to Hinghanghaut. I speak thus on account of the view I entertain of the intrinsic merit of the fibre.

520. In your estimate of the quality of Saw-ginned Dharwar, do you include Coompta cotton?
No; I consider that Coompta cotton has never been brought to market in a condition to test its fair value, on account of its adulteration with seed. I have known Coompta cotton sent to Liverpool, properly cleaned, valued higher than Dharwar Saw-ginned.

521. Have you noticed any difference in last year's crop of Saw-ginned Dharwar?
No. I have not observed that it was better or worse than it has been for the last few years.

522. Do you consider the Saw-ginned Dharwar cotton susceptible of improvement in the state in which it comes to market?
Yes, it might be much better ginned and freer from adulteration.

523. Supposing that the Dharwar cotton was properly prepared, do you think the demand for it, in the English and Continental markets, would increase?
I think the demand would increase materially.

524. Have the direct shipments of cotton from Bombay to Continental ports increased of late?
Yes, especially during the last three years; and I observe no present indications of any falling off.

525. What do you consider would be the effect on Indian cotton of an increased supply of American cotton in the Liverpool market?
It would depreciate the value and check the consumption generally, and especially of the lower qualities. This would be the case both as regards the Liverpool and Continental markets.

526. What is your opinion as to the future of the Indian cotton trade?
It depends very much on the supplies from the United States and South America, the trade has been for a year or so in an unfavourable position, and spinners have objected to use Indian cotton notwithstanding its lower value as compared with American cotton. I believe this is largely owing to the prejudices of operatives, and that if the Indian cotton was brought to market in better condition it would obtain a readier sale. There is no indication at present of any serious diminution in the supply of American cotton. The great drawback under which Indian cotton suffers is that the Liverpool Cotton Brokers' Association do not allow any Indian cotton to be sold to arrive on the basis of a certain quality as is done with American cotton.

527. In what shape is the cotton now transported from Dharwar?
It comes in docras from Dharwar to Bombay where it is full-pressed; a small proportion is full-pressed at Kárwár.

528. If a railway was made do you think the cotton would continue to come to Bombay or Kárwár in docras?
On native account it would come in docras; on European account it would probably be full-pressed up-country.

529. Do you think that Saw-ginned Dharwar is prepared as carefully for market as the other cottons of Western India?

I think that, comparatively, there is little difference between Saw-ginned Dharwar and other cottons, as regards their preparation for market, but in the Dharwar cotton there is more wilful adulteration than in most other sorts.

THE HONOURABLE MR. BYTHELL, *Partner in the Firm of* MESSRS. GADDUM & CO., *Merchants, and Chairman* OF THE BOMBAY CHAMBER OF COMMERCE, *examined.*

6th November 1872.

530. You have had some experience in the Bombay cotton trade?

My firm have done a large trade in cotton for the last seven years, during the whole of which time I have been in Bombay.

531 Have you exported any cotton from Kárwár to Europe direct, or *viâ* Bombay?

Yes, we have shipped in both ways, chiefly *viâ* Bombay.

532. Can you state your opinion as to the quality of Saw-ginned Dharwar cotton?

It is considered one of the higher classes of East-Indian cotton, but English spinners as a rule will not buy it, preferring other sorts. In Russia, however, there is a large demand for it, and we have exported a considerable quantity to that country.

533. Can you state any reason for the disinclination of English spinners to buy Saw-ginned Dharwar, while the Russians can use it?

Several Lancashire spinners after trying cotton that we sold to them of this season's crop, which was of better quality than usual, have stated that they found it wasty and unprofitable and have refused to buy more of the same cotton even at a comparatively low price; both American cotton and Dharwar cotton are Saw-ginned. All spinners complain of the Dharwar staple being injured in ginning, and of cut-seed being mixed up with the cotton. I have heard that a reason why it finds favour in Russia, is that the machinery there is more adapted to the spinning of Saw-ginned cotton than of cotton cleaned with other gins.

534. In your experience of Saw-ginned Dharwar cotton, has it always borne its present uncertain character?

The quality has always been uncertain, since I have known it, and it has been gradually becoming worse. The crops exported in 1870-71, and 1871-72, *i.e.*, the crops grown in 1869-70 and 1870-71, have contained a much larger proportion of very inferior cotton than any previous crops I have seen. The low quality of Dharwar cotton, comprising that which is badly cut in staple, and full of cut-seed and ginning refuse, is about the most unsaleable cotton in the Liverpool market.

535. Which description of Indian cotton is mostly in demand in Russia?

Saw-ginned Dharwar. We have been unable to introduce a trade in other Indian cotton from Bombay to Russia, though we have endeavoured to do so. Small trial shipments of other Indian cotton to Russia have been made, but they have not hitherto led to further business.

536. Can your state you opinion as to the quality of cotton sold as Coompta?

The staple is generally good, being strong, but coarse, but the cotton is so mixed with seed that its value is very irregular and many spinners are afraid of buying it. Lancashire spinners, however are less reluctant to use Coompta than Saw-ginned Dharwar, as at present prepared, and there is a large and steadily increasing consumption of Coompta cotton in the Bombay mills, in which scarcely any description of cotton but Dhollera and Coompta are used. Coompta cotton does not find favour among Continental spinners.

537. To what country is the Dharwar cotton chiefly exported?

The great bulk of it either goes direct to Russia, or is resold in Liverpool for export to Russia. Some is used in Austria, but I believe the quantity is decreasing.

538. Do you think the Russian demand for Dharwar cotton is likely to be maintained or to increase?

I consider that it entirely depends on the supply from America.

539. Have the direct shipments of cotton from Bombay to the Continent, increased of late?

Yes, especially since the opening of the Suez Canal, and I may add that during the same period the exports of East-Indian cotton, from Great Britain to the Continent, have but slightly declined.

540. Do you not consider the state of things described in your last answer as favourable to the developement of the Indian cotton trade?

I deem the opening of the Suez Canal as highly favourable for the development of the Indian cotton trade, because Continental spinners are now supplying themselves to a great extent direct from India instead of buying in Liverpool.

541. Are the direct shipments of cotton from Bombay in English or foreign vessels?

In both—to the Mediterranean the P. and O., the Austran Lloyds, and the Rubattino Line carry almost the whole of the cotton. But to Northern Europe the cotton is usually sent in vessels specially chartered, which are generally English. Cotton is trans-shipped in Egypt from the regular line of steamers to all Southern European ports, and to Havre.

542. How does the cotton crop of Saw-ginned Dharwar grown in 1871-72, compare as to quality with that of previous seasons?

The quantity received before the monsoon of 1872, which was larger than usual, was better than it is ordinarily; but the cotton held in the districts during the monsoon has not yet begun to arrive in Bombay, and it is after the monsoon that we receive the inferior portion of the crop. It is reported from the districts that the crop, as a whole, is better than the two previous ones, the growing season having been more favourable.

543. Would you call Dharwar Saw-ginned a naturally bad staple, or in the main a good staple, injured in preparation?

On the whole a good staple injured by bad ginning and wilful adulteration; if these defects were remedied, the cotton would undoubtedly command a better market. If spinners found that an improvement could be depended upon, the cotton would sell at a higher average price; no other Indian cotton requires so much care at the time of pressing for shipment. European shippers generally extract as least 5 per cent. of rubbish and inferior cotton from their purchases of Dharwar cotton.

544. Can you give an opinion at to the effect on Indian cotton of an increased supply of American cotton?

The question of the extent to which the consumption of cotton goods in the world, will, with improved means of communication, increase, bears materially on the point. I believe the balance of opinion among mercantile men is against India maintaining her position in the cotton market under such circumstances. Different views too are entertained as to the power of America to increase production, and to grow cotton as cheaply as before the war. Indian cotton is no doubt susceptible of great improvement, as an instance of which I may state that superior Macarthy-ginned Broach and Hinghunghaut cotton this season in Liverpool realized within $\frac{1}{2}d$ to $\frac{3}{4}d$ per lb. of "Midding Orleans."

545. Was the improvement you have just mentioned followed on the establishments of local cleaning and pressing?

In Broach it clearly results from the establishment of European ginning factories. But Hinghunghaut Churka-ginned cotton has always since I knew the trade been the most valuable description of Indian cotton.

546. Supposing that European agencies similar to those at Broach were established in the Dharwar districts, what would be the result on the Dharwar cotton?

If a gin as well suited to the Dharwar cotton, as the Macarthy gin is to the Broach cotton, were invented, and if similar European ginning factories were established in the Dharwar districts, no doubt a like improvement in the Dharwar cotton might be expected.

547. Supposing that the railway from Kárwár to Gadak was made, do you think presses for cotton would be erected at the starting stations above the Ghaut, and that the cotton would be sent to the coast in full-pressed bales ready for shipment?

I think presses would certainly be erected. In fact, I believe, presses are to be erected immediately both at Hubli and Gadak, irrespective of the railway. The question of the proportion of the crops which would be sent down in full-pressed bales to a great extent depends upon the course of the market; last year, for example, during the monsoon, the holders of cotton in the Dharwar districts, being satisfied with the prices offered, sold largely to Europeans for delivery after the monsoon, whereas, during the monsoon this year, prices were constantly declining and the bulk of the cotton is still unsold, and holders are now reported to be sending it to the coast for sale. Full-pressed bales of Dharwar cotton, owned by natives, would not be saleable in the Bombay market, except at unfavourable prices, because natives seldom clean the cotton at the time of pressing, and rarely select it so carefully as Europeans. As a proof of this I may mention, that this season, natives have paid on docras by steamer, from Kárwár to Bombay, the same rate of freight per docra, as European shippers have paid per bale; thus paying 150 per cent. higher freight than Europeans.

548. Supposing that a proportion of the Dharwar cotton crop was pressed in the districts by European agency, would you not calculate upon a reduction for pressed bales, on the rate for docras by railway to Kárwár?

Certainly—the G. I. P. make a great difference, the B. B. & C. I. a smaller difference.

APPENDIX No. II.

ESTIMATES AND STATISTICS.

KARWAR STATE RAILWAY.

HIGH LEVEL—SEASON OF 1872.

Abstract of Estimate from Kárwár to Gadak, also showing cost per Mile.

District No.	Length.		Works Expenditure.				Electric Telegraph.						Maintenance.			Rate per Mile for Works.	Ditto, including Contingencies and Superintendence.	
			Indian.		English.		Rate per Mile.		Total Rupees.				Rate per Mile for one year.	Total Rupees.				
							Indian.	English	Indian.		English.							
	M.	Chs.																
1	17	35	3,63,382	6	1,67,569	12	300	550	5,231	4	9,590	10	1,500	26,156	4	31,205	39,005	Exclusive of Rolling Stock.
2	25	46	6,88,799	3	2,34,617	...	300	550	7,672	8	14,066	4	1,500	38,362	8	38,455	48,067	
High Level 3	24	37	51,75,035	...	2,58,282	10	300	550	7,338	12	13,454	6	2,000	48,925	...	77,790	97,237	
4	41	33	8,71,436	5	3,65,686	2	300	550	12,423	12	22,776	14	1,500	62,118	12	32,220	40,287	
5	35	50	5,99,506	1	3,54,530	8	300	550	10,687	8	19,593	12	1,500	53,437	8	29,130	36,412	
Total.....	144	41	40,98,158	15	13,80,686	...	...	...	43,353	12	79,481	14	...	2,29,000	...	.....	.....	Grand Total Rs. 58,30,680-9-0.

Total cost	Rs.	58,30,680
Add 15 per cent. contingencies ...	„	8,74,602
„ 10 per cent. for superintendence	„	5,83,068
Total	Rs.	72,88,350

Average cost per mile...		40,350
Add 15 per cent. contingencies		6,052
„ 10 per cent. for superintendence ...		4,035
Total...	Rs.	50,437

or, say £5,047 per mile.

C. J. SHAW, Chief Engineer,
Kárwár and Hubli Railway Survey.

KARWAR STATE RAILWAY.

DISTRICT No. I.

LENGTH 17 MILES, 35·66 CHAINS.

From KARWAR to KULGUD,

BEING ALSO

ESTIMATES FOR FIRST AND SECOND CLASS STATIONS, RUNNING ENGINE SHED, AND COST OF PERMANENT-WAY.

SEASON 1872.
KARWAR STATE RAILWAY.

District No. 1.

Estimated Cost of Way and Works for 17 *Miles* 35·66 *Chains.*

Description of Works.	Quantity.	Rate.	Per	Amount.	
				Indian.	English.
Earthwork—Including trimming of Slopes as specified in Line Embankments...	189,591	Rs. a. p. 0 4 0	Cubic yard.	Rs. a. p. 47,397 12 0	Rs. a. p.
Ditto in Cuttings, Earth...	77,601	0 4 0	„	19,400 4 0	
Ditto ditto Rock...	4,506	2 0 0	„	9,012 0 0	
Ditto ditto Laterite	13,359	1 4 0	„	16,693 12 0	
Ditto ditto Moorum.	47,472	0 8 0	„	23,736 0 0	
Earthwork—In River and Road Diversions	6772,	0 4 0	„	1,693 0 0	
Ditto Excavation of foundations of Culverts and Bridges	2,587	0 12 0	„	1,940 4 0	
Ditto ditto of foundations in large Bridges and Viaducts... ...	1,431	1 8 0	„	2,146 8 0	
Ballast—For Main Line laid and trimmed	36,645	0 12 0	„	27,483 12 0	
Teak Timber—Inwall plates and Longitudinals of Bridges and Culverts fixed in place, inclusive of fastenings.	316	3 0 0	Cubic foot.	948 0 0	
	Tons cwt.				
Wrought Iron—In plate Girders ...	38 14	178 0 0	Ton.	.....	6,888 12 0
Fixing same ...	38 14	20 0 0	„	774 0 0	.....
Do. In Warren Girders...	37 0	210 0 0	„	.....	7,770 0 0
Fixing same ...	37 0	40 0 0	„	1,480 0 0	.....
Cast Iron—In Screw Piles, &c. ...	.....	.....	.....	.....	.....
Fixing same ...	.....	.....	.....	.....	.....
Carriage—Of Bridge Material from Kárwár to (say) Ballenkerry, including cost of loading and unloading...	75 14	5 0 0	„	378 12 0	.....
	M. chs.				
Permanent-way—For Main Line, including fastening and fixing ...	17 36	7,400 0 0	Mile.	.....	1,29,130 0 0
Carriage of Permanent-way—From Kárwár average lead 9 miles ...	Tons. 1,065	0 6 0	Ton per mile.	3,525 0 0	.....
Carried forward.....	.....	.....	.....	1,56,683 6 0	1,43,788 12 0

Description of Works.	Quantity.	Rate.	Per	Amount. Indian.	Amount. English.	
		Rs. a. p.		Rs. a p.	Rs. a. p.	
Brought forward.. ...	.....	.....	.....	1,56,683 6 0	1,43,788 12 0	
Laying—Of Permanent-way in Main Line as specified	30,712	0 8 0	Lineal yard.	15,356 0 0		
Teakwood Sleepers delivered... ...	34,900	1 8 0	Each.	52,350 0 0		
Level Crossings—Of Government Road, cost of Balance Bars, and fixing same	3	350 0 0	,,	1,050 0 0		
Prickly Pear—Fencing and mounds as specified for ditto	1,200	0 3 0	Lineal yard.	225 0 0		
Rubble Masonry—In Culverts and Small Bridges	2,131	11 0 0	.....	23,441 0 0		
Do. do. in large Bridges.	2,769	10 0 0	Cubic yard.	27,690 0 0		
Laterite Masonry—In Culverts and open top	.....	.....	,,	.....		
Ashlar—In Copings, Caps, Bedstones, and Springers	2,195	1 8 0	Cubic foot.	3,292 0 0		
Coursed Rubble Masonry—In Tunnel Linings	1,065	25 0 0	Cubic yard.	26,625 0 0		
Tunnel Driving	213	100 0 0	Lineal yard.	21,300 0 0		
Retaining Walls	.....	.....	.....	.....		
Dry Pitching—*see* Specification ...	.....	.....	.....	.....		
Land	139	12 0 0	Acre.	1,668 0 0		
Stations—[for details *see* Estimates A, B, C, District No. 1].						
Kárwár, 1st Class ...	.....	.....	.....	23,490 4 0	15,404 0 0	English expenditure comprises Permanent-way in Sidings, Water-Tank, Running-Shed, Weigh-bridge and Turntable, Pump, &c.
Kulgud, 2nd do. ...	.....	.....	.....	10,211 4 0	8,377 0 0	
				3,63,382 8 0	1,67,569 12 0	

C. J. SHAW, Chief Engineer,

Kárwár and Hubli Railway Survey.

August 19th, 1872.

SEASON 1872.

KARWAR STATE RAILWAY.

DISTRICT No. 2.

LENGTH 25 MILES, 46·11 CHAINS.

From KULGUD to RAWÀNGOOLEE.

ESTIMATE.

SEASON 1872.

KARWAR STATE RAILWAY.

District No. 2.

Estimated Cost of Way and Works for 25 *Miles* 46·11 *Chains.*

Description of Works.	Quantity.	Rate.	Per	Amount. Indian.	Amount. English.
		Rs. a. p.		Rs. a. p.	Rs. a. p.
Earthwork—Including trimming of slopes as specified in Line Embankments	452,090	0 5 0	Cubic yard.	1,41,278 2 0	.....
Ditto in Cuttings, Earth	341,109	0 5 0	Do.	1,06,596 9 0	.....
Ditto ditto Rock	16,261	2 0 0	Do.	32,522 0 0	.....
Ditto ditto Laterite ...	.....	.....	.....	.....	.....
Ditto ditto Moorum ...	.....	.....	.....	.....	.....
Earthwork—In River and Road Diversions.....	8,250	0 5 0	.....	2,578 2 0	.....
Ditto—Excavation of foundations of Culverts and Bridges	7,942	0 12 0	.....	5,956 8 0	.....
Ditto ditto of foundations in large Bridges and Viaducts.....	1,374	1 8 0	.....	2,061 0 0	.....
Ballast—For Main Line laid and trimmed	53,707	0 12 0	.....	40,280 4 0	.....
Teak Timber—In wall plates—					
Longitudinals and Culverts fixed in place, inclusive of fastenings	396	3 0 0	.....	1,188 0 0	.....
Wrought Iron—	Tons. cwt.				
In Plate Girders	58 10	178 0 0	.....	.....	10,413 0 0
Fixing same	.....	20 0 0	.....	1,170 0 0	.....
Warren Girders	36 0	210 0 0	.....	.....	7,560 0 0
Fixing same	.....	40 0 0	.....	1,440 0 0	.....
Cast Iron—					
In Screws, Piles, &c.	.....	.....	.....	.....	.....
Fixing same.....	.....	.....	.....	.....	.....
Carriage—Of Bridge Material from Kárwár to (say) 30·40 Miles, including cost of loading and unloading	94 10	11 8 0	Ton.	1,086 12 0	.....
Permanent-way—For Main Line including fastenings and fixing.....	M. chs. 25 46	7,400 0 0	.....	.....	1,89,255 0 0
Carried forward.....	.....	.....	.....	3,36,157 5 0	2,07,228 0 0

Description of Works.	Quantity.	Rate.	Per	Amount. Indian.	Amount. English.	
		Rs. a. p.		Rs. a. p.	Rs. a. p.	
Brought forward.....	.....	.....	.....	3,36,157 5 0	2,07,228 0 0	
Carriage of Permanent-way from Kárwár to 30·40 Miles	1,602	0 6 0	Ton per Mile.	18,322 14 0	.....	
Laying of Permanent-way in Main Line as specified	45,012	0 8 0	Lineal yard.	22,506 0 0	.....	
Teakwood Sleepers—Delivered	51,150	1 8 0	Each.	76,725 0 0	.....	
Level Crossings—Of Government Roads, cost of Swing Bars and fixing same .	No. 7	350 0 0	Do.	2,450 0 0	.....	
Prickly Pear—Fencing and mounds as specified	2,800	0 3 0	Lineal yard.	525 0 0	.....	
Rubble Masonry—In Culverts and small Bridges.....	13,201	11 0 0	.....	1,45,211 0 0	.....	
Ditto ditto in large Bridges.	2,779	10 0 0	Cubic yard.	27,790 0 0	.....	
Laterite Masonry—In Culverts and open top	.....	.....	.....	.....	.....	
Ashlar—In Copings, Caps, Bedstones, and Springers	8,251	1 8 0	Cubic foot.	12,376 8 0	.....	
Block in Course—Masonry in Arches...	2,670	1 8 0	Cubic foot.	4,005 0 0	.....	
Rubble Masonry—In Tunnel linings ...	440	25 0 0	Cubic yard.	11,000 0 0	.....	
Tunnel Driving	88	100 0 0	Lineal yard.	8,800 0 0	.....	
Retaining Walls	.....	.....	.....	.....	.....	
Dry Pitching	.....	.....	.....	.....	.....	
Land	209	12 0 0	Acre.	2,508 0 0	.....	
Stations—[for Details *see* Estimate A, B, C, District No. I]	.....	.....	.....	.....	.....	
Hebool, 2nd Class	.....	.....	.....	10,211 4 0	8,377 0 0	English expenditure comprises Permanent-way in Sidings, Water Tank, Running Shed, Weigh-Bridges, and Turntable, Pump, &c.
Rawangoolee, 2nd Class	.....	.....	.....	10,211 4 0	8,377 0 0	
Steel rails for Adloor ghaut 6 miles 20 chains at 56 Tons, 14 Cwt. per mile say	354½	30 0 0	Ton.	.....	10,635 0 0	
Total.....	.....	.....	.....	6,88,799 3 0	2,34,617 0 0	

C. J. SHAW, Chief Engineer,
Kárwár and Hubli Railway Survey.

August 19th, 1872.

SEASON 1872.

KARWAR STATE RAILWAY.

HIGH LEVEL LINE.

DISTRICT No. 3.

LENGTH 24 MILES, 73·68 CHAINS.

From RAWANGOOLEE to YELLAPUR.

ESTIMATE.

SEASON 1872.

HIGH LEVEL LINE.

District No. 3.

KARWAR STATE RAILWAY.

Estimated Cost of Way and Works for 24 Miles 37·68 Chains.

Description of Works.	Quantity.	Rate.	Per	Amount. Indian.	Amount. English.
		Rs. a. p.		Rs. a. p.	Rs. a. p.
Earthwork—Including trimming of slopes as specified in Line Embankments	577,176	0 6 0	Cubic yard.	2,16,441 0 0	.....
Ditto in Cuttings, Earth	631,469	0 6 0	.....	2,36,800 14 0	.....
Ditto ditto Rock	91,194	2 8 0	.....	2,27,985 0 0	.....
Ditto ditto Laterite	6,000	1 8 0	.....	9,000 0 0	.....
Ditto ditto Moorum	.....	.....	.....	.....	.....
Earthwork—In River and Road Diversions	2,640	0 6 0	.....	990 0 0	.....
Earthwork—Excavation of foundations of Culverts and Bridges	9,617	1 0 0	.....	9,617 0 0	.....
Ditto ditto of foundations in large Bridges and Viaducts	2,302	2 8 0	.....	5,755 0 0	.....
Ballast—For Main Line laid and trimmed, broken Stone	51,397	2 0 0	.....	1,02,794 0 0	.....
Teak Timber—In Wall Plates and Longitudinals of Bridges and Culverts fixed in place, inclusive of fastenings.	515	3 0 0	Cubic foot.	1,545 0 0	.....
Wrought Iron—	Ton. cwt. lbs.				
In Plate Girders	19 16 0	178 0 0	Ton.	.....	3,524 8 0
Fixing same	.....	20 0 0	.....	396 0 0	.....
In Warren Girders	.....	.....	.....	.....	.....
Fixing same	.....	.....	.....	.....	.....
Cast Iron—					
In Screw Piles, &c.	.....	.....	.....	.....	.....
Fixing same	.....	.....	.....	.....	.....
Carriage—Of Bridge Material from Kárwár to main lead, including cost of loading and unloading	19 16 0	0 6 0	Ton per Mile.	326 12 0	.....
Permanent-way—For Main Line, including fastenings and fixing	M. chs. 24 38	9,095 0 0	Mile.	.....	2,22,600 2 0
Carriage—Of Permanent-way from Kárwár to 55¾ miles	1,503	0 6 0	Ton per Mile.	31,422 0 0	.....
Laying—Of Permanent-way in Main Line as specified	43,076	0 8 0	Lineal yard.	21,538 0 0	.....
Carried forward	.....	.....	.....	8,64,610 10 0	2,26,124 10 0

Estimated for Steel Rails £3 per ton over Iron.

Description of Works.	Quantity.	Rate.	Per	Amount. Indian.	Amount. English.	
		Rs. a. p.		Rs. a. p.	Rs. a. p.	
Brought forward.....	.....	.....	.....	8,64,610 10 0	2,26,124 10 0	
Teakwood Sleepers—Delivered	48,950	1 8 0	Each.	73,425 0 0	.....	
Level Crossings—Of Government Roads, cost of Swing Bars, and fixing the same.....	No. 2	350 0 0	Each.	700 0 0	.....	
Prickly Pear—Fencing and mounds as specified	800	0 3 0	Lineal yard.	150 0 0	.....	
Rubble Masonry—In Culverts and small Bridges.....	12,521¼	12 8 0	Cubic yard.	1,56,515 10 0	.....	
Ditto do In large Bridges ...	9,942	11 8 0	.....	1,14,333 0 0	.....	
Laterite Masonry—In Culverts and open top	.....	.....	.....	.....	.....	
Ashlar—In Copings, Caps, Bedstones and Springers	10,982	2 0 0	Cubic foot.	21,964 0 0	.....	
Block in Course—In Arches	10,841	2 0 0	.....	21,682 0 0	.....	
Coursed Rubble Masonry—In Tunnel Linings.....	4,895	25 0 0	Cubic yard.	1,22,375 0 0	.....	
Tunnel Driving	979	120 0 0	Lineal yard.	1,17,480 0 0	.....	
Retaining Walls	3,090	11 8 0	Cubic yard.	35,535 0 0	.....	
Dry Pitching	.....	11 8 0	Sq. yard.	.....	.....	
Land	196	12 0 0	Acre.	2,352 0 0	.....	
Stations—[for Details, *see* Estimate A, B, C, District No. 1].						
Sleemuney, 2nd Class.....	.....	.....	.....	10,211 4 0	8,377 0 0	English expenditure comprises Permanent-way in Sidings, Water Tank, Running Shed, Weigh-Bridge and Turntables, Pumps, &c.
Iddagongee, 2nd Class.....	.....	.....	.....	10,211 4 0	8,377 0 0	
Yellapur, 1st Class	.....	.....	.....	23,490 4 0	15,404 0 0	
Total.....	.....	.....	.....	15,75,035 0 0	2,58,282 10 0	

C. J. SHAW, Chief Engineer,

Kárwár and Hubli Railway Survey.

August 19*th*, 1872.

SEASON 1872.

KARWAR STATE RAILWAY.

DISTRICT No. 4.

LENGTH 41 MILES, 32·62 CHAINS.

From YELLAPUR to HUBLI.

ESTIMATE.

SEASON 1872.

KARWAR STATE RAILWAY.

District No. 4.

Estimated Cost of Way and Works for 25 Miles 46·11 Chains.

Description of Works.	Quantity.	Rate.	Per	Amount. Indian.	Amount. English.
		Rs. a. p.		Rs. a. p.	Rs. a. p.
Earthwork—Including trimming of Slopes as specified in Line.....					
Embankments	6,30,239	0 5 0	Cubic yard.	1,96,966 9 0	.....
Ditto in Cuttings, Earth	4,40,411	0 5 0	,,	1,37,628 7 0	.....
Ditto ditto Rock	.....	.....	,,	.....	.....
Ditto ditto Laterite ...	.....	.....	,,	.....	.....
Ditto ditto Moorum ...	.....	.....	,,	.....	.....
Earthwork—In River and Road Diversions.....	14,667	0 5 0	,,	4,583 7 0	.....
Earthwork—Excavation of foundations of Culverts and Bridges	5,450	0 12 0	,,	4,087 8 0	.....
Ditto ditto of foundations in large Bridges and Viaducts.....	1,644	1 8 0	,,	2,466 0 0	.....
Ballast—For Main Line laid and trimmed	86,968	1 0 0	,,	86,968 0 0	.....
Teak Timber—In Wall Plates, Longitudinals, of Bridges and Culverts fixed in place, inclusive of fastenings.	313	3 0 0	,,	939 0 0	.....
	Tons.cwt.lbs.				
Wrought Iron—In Plate Girders	8 16 0	178 0 0	Ton.	.....	1,566 6 0
Fixing same	.....	20 0 0	,,	176 0 0	.....
Do. In Warren Girders ...	51 12 0	210 0 0	,,	.....	10,836 0 0
Fixing same	.....	40 0 0	,,	2,064 0 0	.....
Cast Iron—In Screws, Piles, &c.	54 15 0	115 0 0	,,	.....	6,296 4 0
Fixing same	.....	40 0 0	,,	2,190 0 0	.....
Carriage—Of Bridge Material from Kárwár, miles 100 average, including cost of loading and unloading	115 3 0	0 6 0	Ton per Mile.	4,318 2 0	.....
	M. chs.				
Permanent-way—For Main Line including fastenings and fixing.....	41 33	7,400 0 0	Mile.	.....	3,06,452 8 0
Carriage—Of Permanent-way from Kárwár, miles 89 average	2,546	0 6 0	Ton per Mile.	84,972 12 0	.....
Carried forward.....	.....	.....	.....	5,27,359 13 0	3,25,151 2 0

Description of Works.	Quantity.	Rate.	Per	Amount. Indian.	Amount. English.	
		Rs. a. p.		Rs. a. p.	Rs. a. p.	
Brought forward.....	.....	.....	.....	5,27,359 13 0	3,25,151 2 0	
Laying of Permanent-way in Main Line as specified	72,886	0 8 0	Lineal yard.	36,443 0 0	.....	
Teakwood Sleepers—Delivered	82,825	1 8 0	Each.	1,24,237 8 0	.....	
Level Crossings—Of Government Roads, cost of Swing Bars, and fixing same .	No. 4	350 0 0	„	1,400 0 0	.....	
Prickly Pear—Fencing and mounds, as specified, 400 yards at each Crossing	1,600	0 3 0	Lineal yard.	300 0 0	.....	
Rubble Masonry—In Culverts and small Bridges.....	6,258¾	10 0 0	Cubic yard.	62,587 8 0	.....	
Ditto ditto in large Bridges.	4,166	9 0 0	„	37,494 0 0	.....	
Laterite Masonry—In Culverts and Open Top.....	.....	.....	.....	.....	.....	
Ashlar—In Copings, Caps, Bedstones and Springers	6,987	1 8 0	Cubic foot.	10,480 8 0	.....	
Block in Course—Masonry in Arches...	6,592	1 8 0	„	9,888 0 0	.....	
Tunnel Driving	.....	.....	.....	.....	.....	
Retaining Walls	.....	.....	.....	.....	.....	
Dry Pitching	.....	.....	.....	.....	.....	
Land	332	12 0 0	Acre.	3,984 0 0	.....	
Pitching in Mortar.....	1,046	3 0 0	Square yard.	3,138 0 0	.....	
Stations—[for Details *see* Estimate A, B, C, District No. 1]						
Kirwhutty, 2nd Class.....	.....	.....	.....	10,211 4 0	8,377 0 0	English expenditure comprises Permanent-way in Sidings, Water Tank, Running shed, Weigh-Bridges, and Turntables, Pump, &c.
Khulghutgee, 2nd Class	.....	.....	.....	10,211 4 0	8,377 0 0	
Misracota, 2nd Class	.....	.....	.....	10,211 4 0	8,377 0 0	
Hubli, 1st Class	.....	.....	.....	23,490 4 0	15,404 0 0	
Total.....	.....	.....	.....	8,71,436 5 0	3,65,686 2 0	

C. J. SHAW, Chief Engineer,
Kárwár and Hubli Railway Survey.

August 19th, 1872.

SEASON 1872.

KARWAR STATE RAILWAY.

HIGH LEVEL LINE.

DISTRICT No. 5.

LENGTH 35 MILES, 50·38 CHAINS.

From HUBLI to GADDAK.

ESTIMATE.

SEASON 1872.

KARWAR STATE RAILWAY.

District No. 5.

Estimated Cost of Way and Works for 35 *Miles* 50·38 *Chains.*

Description of Works.	Quantity.	Rate.	Per	Amount. Indian.	Amount. English.	
		Rs. a. p.		Rs. a. p.	Rs. a. p.	
Earthwork—Including trimming of slopes as specified in Line						
Embankments	3,15,347	0 4 0	Cubic yard.	78,836 12 0	.....	
Ditto in Cuttings, Earth	64,641	0 4 0	„	16,160 4 0	.....	
Ditto ditto Rock	.....	.....	„	.....	.....	
Ditto ditto Laterite.....	.....	.....	„	.....	.....	
Ditto ditto Moorum	56,147	0 8 0	„	28,073 8 0	.....	
Earthwork—In River and Road Diversions	.....	.....	„	.....	.....	
Earthwork—Excavation of foundations of Culverts and Bridges	3,035	0 8 0	„	1,517 8 0	.....	
Ditto ditto of foundations in large Bridges and Viaducts	1,236	1 0 0	„	1,236 0 0	.....	
Ballast—For Main Line laid and trimmed	74,812	1 0 0	„	74,812 0 0	.....	
Teak Timber—In Wall Plates and Longitudinals and Culverts fixed in place, inclusive of fastenings.....	162	3 0 0	Cubic foot.	486 0 0	.....	
	Ton. cwt. lbs.					
Wrought Iron—In Plate Girders	5 0 0	178 0 0	Ton.	.....	890 0 0	
Fixing same.....	... ..	20 0 0	„	100 0 0	.....	
Do. In Warren Girders	158 13 0	210 0 0	„	.....	33,316 8 0	
Fixing same	.....	40 0 0	„	6,346 0 0	.....	
Cast Iron—In Screw Piles, &c.	213 8 0	115 0 0	„	.....	24,541 0 0	
Fixing same.....	.....	40 0 0	„	8,536 0 0	.....	
Carriage—Of Bridge Material from Kárwár, miles 100 average, including cost of loading and unloading	404 0 38	0 6 0	Ton per Mile.	19,241 11 0	.....	
	M. chs.					
Permanent-way—For Main Line, including fastenings and fixing	35 50	7,400 0 0	Mile.	.....	2,63,625 0 0	Taken at 35 miles, 50 chains.
	Tons.					
Carriage—Of Permanent-way from Kárwár, to miles 127	2,153	0 6 0	Ton per Mile.	1,02,536 10 0	.....	
Carried forward.....	.....	.....	.....	3,37,882 5 0	3,22,372 8 0	

Description of Works.	Quantity.	Rate.	Per	Amount. Indian.	Amount. English.	
		Rs. a. p.		Rs. a. p.	Rs. a. p.	
Brought forward.....	.....	.....	.....	3,37,882 5 0	3,22,372 8 0	
Laying—Of Permanent-way in Main Line, as specified.....	61,793	0 8 0	Lineal yard.	31,350 0 0	.....	
Teakwood—Sleepers delivered	71,250	1 8 0	Each.	1,06,875 0 0	.....	
Level Crossings—Of Government Roads, cost of Swing Bar, and fixing same..	No. 1	350 0 0	„	350 0 0	.....	
Prickly Pear—Fencing and mounds, as specified	400	0 3 0	Lineal yard.	75 0 0	.....	
Rubble Masonry—In Culverts and small Bridges.....	2,969¾	10 0 0	Cubic yard.	29,697 8 0	.....	
Ditto In large Bridges ...	2,620	9 0 0	.....	23,580 0 0	.....	
Laterite Masonry—In Culverts and open top	.....	.....	.....	.....	.....	
Ashlar—In Copings, Caps, Bedstones and Springers	5,337	1 8 0	Cubic foot.	8,005 8 0	.....	
Block in Course—In Arches	7,696	1 8 0	„	11,544 0 0	.....	
Tunnel Driving	.....	.....	.....	.....	.....	
Retaining Walls	.....	.....	.....	.....	.....	
Dry Pitching	.....	.....	.....	.....	.....	
Land	281	12 0 0	Acre.	3,372 0 0	.....	
Pitching in Mortar	954	3 0 0	Sq. yard.	2,862 0 0	.....	
Stations—[for details *see* Estimate A. B, C, District No. 1].						
Seergumpee, 2nd Class	.....	.....	.....	10,211 4 0	8,377 0 0	English expenditure comprises Permanent-way in Sidings, Water Tank, Running Shed, Weigh-Bridge and Turntables, Pumps, &c.
Annigherry, do.	.....	.....	.....	10,211 4 0	8,377 0 0	
Gadak, 1st Class.....	.....	.....	.....	23,490 4 0	15,404 0 0	
Total.....	.....	.....	.....	5,99,506 1 0	3,54,530 8 0	

C. J. SHAW, Chief Engineer,
Kárwár and Hubli Railway Survey.

August 19th, 1872.

PUBLIC WORKS DEPARTMENT.

STATE RAILWAYS.

Simla, 14th September 1872.

FROM THE CONSULTING ENGINEER TO THE

GOVERNMENT OF INDIA FOR STATE RAILWAYS,

To

LIEUT.-COLONEL HANCOCK, R.E.

Subject,—ROLLING-STOCK, KA'RWA'R RAILWAY.

MY DEAR COLONEL HANCOCK,

In reply to your letter No. 2642 of the 9th instant, I am not aware that any detailed estimate has been made of the probable cost of rolling-stock for the Holkár and Rajputana Railways. A mileage rate has sometimes been assumed, varying from £600 to £800 per mile, in order to arrive at the probable total approximate cost of these railways stocked, but such mileage rates, though useful as approximations, are sometimes delusive and apt to mislead.

I should prefer to consider the individual characteristics of railway and its traffic, and estimate the cost of rolling-stock accordingly.

The conditions of the Kárwár Railway are somewhat peculiar, as the greater portion of the traffic will be through traffic to, or from, the districts beyond the Ghaut country, and on the portion between those districts and the sea, or for nearly 100 miles, there will be but little intermediate traffic, except in timber.

The following is a list of the rolling-stock I would recommend for the Kárwár Railway if made:—

				£
23	Engines at	£1,500	=	34,500
5	1st Class Carriages at	„ 400	=	2,000
8	2nd do. do.	„ 340	=	2,720
30	3rd do. do.	„ 250	=	7,500
4	Horse-boxes	„ 200	=	800
2	Carriage Trucks	„ 100	=	200
12	Brake Vans	„ 250	=	3,000
200	Covered Goods Wagons	„ 120	=	24,000
50	High-sided	„ 100	=	5,000
80	Low-sided	„ 90	=	7,200
20	Timber-Trucks	„ 100	=	2,000
20	Miscellaneous	„ 120	=	2,400
			Total	£91,320

The wagons are assumed to have a capacity of from 400 to 500 cubic feet, and to be capable of carrying loads of 5 to 5½ tons' weight. The amount above estimated, with the addition of 10 per cent. contingencies, would work out to about Rs. 7,000 per mile. I am of opinion, therefore, that the sum of Rs. 6,000 is rather too low.

I remain, &c.,

(Signed) G. L. MOLESWORTH.

PUBLIC WORKS DEPARTMENT.

STATE RAILWAYS.

Calcutta, 27th November 1872.

To

LIEUT-COLONEL HANCOCK, R.E.,

Subject,—ROLLING-STOCK, KA'RWA'R RAILWAY.

MY DEAR COLONEL HANCOCK,

* * * * * * * *

* * * * * * * *

2. With regard to my estimate of £1,500 per engine, there are two points for consideration. 1*st*, as to price it must be remembered that our "heavy" engines are only

comparatively heavy, being really very light engines only weighing 18 tons in working trim; 2*ndly*, as to traction power they are designed only for slow speeds, *i.e.*, with *comparatively* large cylinders (*really* small) long strokes and small driving wheels, the little piston working at a great rate, but the engine itself going at a slow speed. I do not like these engines for the *ordinary* work of the line, and only propose to have 4 of them used as asserting engines on the Ghâut section. We had only 4 such engines on the Ceylon Incline, and found that they were not in regular use, one such engine in steam at once being sufficient for *general* purposes; the ordinary type of engine being, as a rule, sufficient in assisting, except for the very heavy train. I put down the engines at an average of £1,500 each; it would perhaps have been more correct to have entered them as 19 engines at £14,000, and 4 engines at £2,000. The tank engines we have got cost us £1,000 in England, they are 16-ton engines; the light engines ought to cost a little more but not much, say £150 or £200 at the outside, and the remaining £200 or £250 is ample for freight and erection. With regard to the traction force, the tank engines, which were calculated exactly on the same basis as the "light" and "heavy," quite fulfil the conditions I expected from them in this respect. If you contemplated the use of heavy engines exclusively, I think £2,000 each will be ample, but I doubt the desirability of using them, except as assisting engines on the Kárwár Railway.

Yours very sincerely,

(Signed) G. L. MOLESWORTH.

No. 1808 OF 1872.

To

W. H. HAVELOCK, ESQ.

President, Kárwár-Hubli Railway Committee.

Púna, 24th September 1872.

SIR,

I have the honour to forward herewith a statement showing the deliveries of salt from the works between Vingorla and Bhutkul, the imports and exports of salt at the several ports situate between those places, and the imports by land from Goa across the several divisions of the Frontier Preventive Line, for each of the last five years as requested in your letter No. 4454, dated the 4th instant.

2. The average annual deliveries, exports and imports, for that period are shown in the table below:—

	Deliveries at the Works.	Exports by Sea.	Imports by Sea.	Foreign Salt imported by Land.
Ports.	Ind. Mds.	Ind. Md.	Ind. Mds.	Ind. Mds.
Vingorla	50,059	.....	42,110	.....
Kárwár	790	1,241	750	.....
Ankola	122,890	2,130	2,584	.....
Honore	43,158	2,234	29,869	.....
Frontier Divisions.				
Sawuntwaree	.....	.....	.....	42,677
Beedee	.....	.....	.....	42,909
Diggee	.....	.....	.....	31,051
Total...	216,897	5,605	75,313	116,637

3. Salt produced at and imported into Vingorla, the whole of the imports across the Sawuntwaree frontier and about one-third of the imports across the Beedee frontier, are mostly consumed in the district lying to the north of a line drawn from Vingorla through Belgaum running nearly parallel with the proposed railway at a minimum distance of 60 miles; and as Belgaum is only about 75 miles from Vingorla, and a first-class road communicates between the two places, and as the distance from Kárwár to Hubli (the nearest station to Belgaum on the proposed line) exceeds 100 miles, it seems improbable that the population which now derives its supply of salt from Vingorla, and from beyond the frontiers above specified, could get it at cheaper rates from any point on the new railway.

4. If the railway is made it will be advisable to close the existing salt works at Ankola and Honore, and to concentrate the manufacture at one large work in immediate proximity to the Line. In this case the whole of the salt now delivered from the works in Kanara, and the whole of the imports at the several ports, deducting therefrom the exports and making a small additional reduction on account of local consumption, would seek transit by the railway The arrangement would also enable Government to make proper provision at a reasonable cost for the prevention of the illicit removal of salt from the works, in which event both the salt revenue and railway returns would benefit in like proportion. Salt smuggling from the works will not in my opinion be over estimated at 25 per cent. of the licit removals. The opening of the railway will also cheapen the price of salt inland, thereby inducing an increase in the quantity consumed by each individual, and will besides extend the area of consumption of Kanara salt. An increase of demand amounting to 20 per cent. of the present out-turn of salt, on the coast of Kanara, may I think be fairly anticipated from the two causes just named; on the above premises the quantity of salt that will probably seek the line may be estimated as follows:—

		Indian Maunds.
Deliveries from works at Kárwár, Ankola and Honore...		1,66,838
Imports by sea	33,203	
Deduct Exports	5,605	
		27,598
25 per cent. on deliveries when smuggling from salt works is stopped		41,709
20 per cent. on out-turn on the coast of Kanara on account of increased individual consumption and development of trade		38,887
Total.....		275,032
Deduct for local consumption.....		10,000
Total quantity of salt seeking transit by railway.....		265,032

or about 10,000 tons.

5. It will be observed that the whole of the imports by land from Goa are omitted in the above calculation. The reason is that I do not think that under existing circumstances the construction of the railway could in any way interfere with the trade in Goa salt, because the facilities for smuggling across the frontier and the profits derived from it are so great. The country which marches with the Goanese border is very broken and jungly, and it is impossible to guard it effectually except at inordinate cost, so long as the importation of salt from Goa on payment of duty is permitted. If its importation were entirely prohibited the guarding of the Frontier would be comparatively easy, while the railway would bring Kanara salt within the reach of the greater part of the population, which now consumes Goa salt at rates below those at which it can now obtain its supply, when duly excised. If the import of salt from Goa should at any time be prohibited, about 3,000 tons over and above the estimate given in the preceding para. would seek carriage by the railway each year.

I have the honor to be,
Sir,
Your most obedient servent,
C. PRITCHARD,
Acting Collector of Salt Revenue.

No. 2852 OF 1872.

RAILWAY CONSULTING ENGINEER'S DEPARTMENT.

To

THE DEPUTY CONSERVATOR OF FORESTS,
Southern Division.

Sir, *Bombay, 26th September* 1872.

Referring to my letter No. 3890 of the 7th December 1870, and your replies Nos. 12 and 60, dated, respectively, the 3rd and 18th January 1871, I beg to state that the dimensions of sleepers for the Kárwár Railway have been fixed at 6′ × 8″ × 4″ and to request that you will inform me if there will be any modification in the prices mentioned in your letters above quoted. The favour of a very early reply is requested as the information is required for the Committee now siting to discuss the project.

I have, &c.,
H. F. HANCOCK, Lieut-Colonel, R. E.,
Acting Consulting Engineer for Railways.

No. 1101 of 1872.

FROM

THE CONSERVATOR OF FORESTS,
Southern Division.

To

THE ACTING CONSULTING ENGINEER FOR RAILWAYS, BOMBAY.

Conservator's Office, Southern Division,

SIR, *Camp Belgaum. 30th September* 1872.

In reply to your letter No. 2852 of the 26 instant, just now received, I have the honor to inform you that an increase in the size of the sleepers for the proposed Kárwár Railway

from 5′ ×7″×3″ to 6′×8″×4″ will increase the cost to Rupees 1-7-0, between Kárwár and Kirwuty and Rs. 1-9-0 between Kirwuty and Gadak, or an average throughout the whole line of Rs. 1-8-0 for each sleeper, instead of Rs. 1-7-0, as shown in the 2nd paragraph of my letter No. 12 of the 3rd January 1871.

I have the honor to be,
Sir,
Your most obedient servent,
W. PEYTON, Major,
Conservator of Forests, Southern Division.

No. 4453 OF 1872.

To

THE CONSERVATOR OF FORESTS,
Southern Division.

Púna, 4th September 1872.

SIR,

I have the honor to request you will inform the Committee on the Kárwár Hubli State Railway the probable amount of logs, planks, and firewood which on an average estimate of the profitable operations of your Department, you could place annually for carriage on the line; also the points to and from which the timber, &c., would be sent in order to enable the Committee to judge the distances which the traffic from your Department would have to be connected.

2. Will you also have the goodness to inform the Committee, the rate at which your Department could furnish a minimum of ten thousand (10,000) tons of wood-fuel for the Locomotives.

3. This information is required with the least practicable delay.

I have, &c.,
W. H. HAVELOCK,
Revenue Commissioner, S. D.,
and President of Committee.

No. 977 OF 1872.

To

THE REVENUE COMMISZIONER, S. D.,
President, Kárwár and Hubli State Railway Committee.

Conservator's Office, S. D.,
Camp Belgaum, 6th September 1872.

SIR,

I have the honour to acknowledge the receipt of your letter No. 4453, of the 4th instant, and in reply to state that a Railway through the Kanara District from Kárwár to Gadak, *viâ* the Arbyle Ghaut, Kirwuty and Hubli, would, in my opinion, vastly increase the value of the Kanara forests, and that I anticipate, as soon as ever through traffic is established to Gadak, we may confidently expect the yearly exportation, into the Dharwar Districts of the following forest produce along this line from the Depôts that would be formed close to the Railway stations, selected in the vicinity of Sunksal, Yellápur and Kirwuty:—

15,000 Bombay Candies of 12½ cubic feet each building timber.
6,000 Tons of fireweod.
1,500,000 Bamboos.

2. This is not anything like the full export of forest produce from Kanara, as in the direction of Belgaum and Kolapoor from the Hullihál Depôt, Bunkapoor, and Hangul, from the Sirsee Depôts and Bombay by sea from Karwar much will also be exported independent of the line. I think it well to mention this, so that no surprise may be felt at what may appear a small export, as the figures refer only to the traffic the line may expect. The direct advantage by increase of the net revenue of the forests in consequence of the line will not fall short of, I should say, at least Rs. 1,20,000; and any one knowing the District will I feel sure agree with me that I have not over-estimated this.

3. In addition to the receipts the line may expect from the above estimated exports towards the Dharwar Districts, it may also by special arrangement, with the Forest Department, derive a fair portion of the working charges for the conveyance of timber to the Depôts from such points of the line as the Department may collect it on, instead of having it dragged or carted at a high rate as at present.

4. The Forest Department will be prepared to furnish for the locomotives 10,000 tons of wood fuel along the line from Kárwár to Deveekop in the Dharwar District at the rate of Rs. 1-8 per ton for the first 3 years, with an additional 4 annas per ton after that period as may be found necessary in consequence of the more extended area of the firewood collections. This must be considered as the minimum or actual cost to the Department, and it will rest with Government to fix a rate if thought proper to show some slight profit to the Department in consideration for its labour.

I have, &c.,
(Signed) W. PEYTON, Major,
Conservator of Forests, Southern Division.

No. 998 OF 1872.

To

THE REVENUE COMMISSIONER, S. D.,

President, Kárwár and Húbli State Railway Committee.

Conservator's Office, Southern Division,
Camp Belgaum, 7th September, 1872.

SIR,

In continuation of my letter No. 997 of yesterday's date, I have the honour, with reference to the concluding para. therof, to request you will for Rs. 1-8 per ton, as the miuimum cost for wood fuel to be delivered along the line from Kárwár to Deveekop, read Rs. 1-12 per ton for the first 3 years, with an additional 4 annas per ton as found necessary when the area of the firewood operations got to be extended.

2. I believe also the line would secure between the Arbyle station and Huteegeree the carriage of about 5,00,000 Bamboos to Kárwár yearly for export to Bombay and elsewhere.

I have, &c.,
(Signed) W. PEYTON Major,
Conservator of Forests, Southern Division,

STATEMENT showing the Deliveries of Salt at the works as well as Imports and Exports of Salt at the undermentioned Ports and Frontier Stations.

Names of Ports and Frontier Divisions.	In 1866-67.				In 1867-68.				In 1868-69.				In 1869-70.				In 1870-71.				Average of five years.				Remarks.
	Deliveries at the Salt works.	Salt Imported by Sea.	Salt Exported by Sea.	Foreign Salt Imported by Land across.	Deliveries at the Salt works.	Salt Imported by Sea.	Salt Exported by Sea.	Foreign Salt Imported by Land across.	Deliveries at the Salt works.	Salt Imported by Sea.	Salt Exported by Sea.	Foreign Salt Imported by Land across.	Deliveries at the Salt works.	Salt Imported by Sea.	Salt Exported by Sea.	Foreign Salt Imported by Land across.	Deliveries at the Salt works.	Salt Imported by Sea.	Salt Exported by Sea.	Foreign Salt Imported by Land across.	Deliveries at the Salt works.	Salt Imported by Sea.	Salt Exported by Sea.	Foreign Salt Imported by Land across.	
Ports.																									
Vengurla	32,602	24,478	....	....	48,817	44,450	....	....	49,258	54,918	....	....	10,051	32,106	....	....	69,364	54,596	....	....	50,059	42,110	....	....	The deliveries, exports and imports at the several sub-ports are included in this return in the entries opposite the names of the chief ports to which they are subsidiary.
Kárwár	....	412	....	....	180	1,411	180	....	114	651	114	....	....	389	797	....	2,860	889	5,112	....	790	750	1,241	....	
Ankola	1,30,058	2,373	8,088	....	1,19,041	2,526	864	....	1,37,942	3,547	1,041	....	1,15,786	662	658	....	1,11,624	3,810	....	....	1,22,890	2,584	2,130	....	
Honore	37,219	30,802	915	....	44,627	32,861	3,410	....	52,130	32,311	6,216	....	45,022	28,605	681	....	36,790	24,766	....	....	43,158	29,869	2,234	....	
Frontier Divisions.																									
Sáwantwári	....	....	....	49,355	....	....	....	41,301	....	....	....	36,191	....	....	....	39,915	....	....	....	46,625	....	....	....	42,677	
Bídí	....	....	....	43,463	....	....	....	44,362	....	....	....	50,767	....	....	....	38,294	....	....	....	37,661	....	....	....	42,909	
Digi	....	....	....	29,461	....	....	....	29,172	....	....	....	28,019	....	....	....	35,764	....	....	....	32,837	....	....	....	31,051	
Total....	1,99,879	58,065	9,003	1,22,279	2,12,665	81,248	4,454	1,14,835	2,39,444	91,427	7,371	1,14,977	2,11,858	61,762	2,086	1,13,973	2,20,638	84,061	5,112	1,17,123	2,16,897	75,313	5,605	1,16,637	

C. PRITCHARD,
Acting Collector of Salt Revenue.

Poona, 24th September 1872.

ABSTRACT from the annexed Statements furnished by the Department of the Collector of Salt Revenue of Total Imports and Exports in Indian Maunds of the Ports of the following 5 Talukas for the Years 1868-69, 1869-70, 1870-71.

Talukas.	Imports.						Exports.					
	1868-69.		1869-70.		1870-71.		1868-69.		1869-70.		1870-71.	
	Mds.	lbs.	Mds.	lbs.	Mds.	lbs.	Mds.	lbs.	Mds.	lbs.	Mds.	lbs.
Honore	53,571	61½	40,698	61½	38,424	0	109,537	41	45,560	20½	34,708	20½
Ankola	8,873	20½	13,731	41	7,996	20½	10,036	21	6,018	4	4,859	35
Coompta	161,682	41	376,518	20½	280,327	61½	585,689	61½	514,765	0	357,598	0
Kárwár	355,299	61½	107,150	61½	257,364	41	211,367	41	218,729	0	117,959	60½
Vengurla	305,554	0	899,775	41	392,571	61½	378,401	41	261,390	20½	736,463	20½
Total omitting the Ports of Honore and Vengurla...	525,855	41	497,400	41	545,688	41	807,093	41½	739,512	4	480,417	13½
	Tons. c. q. lbs.		Tons. c. q. lbs.		Tons. c. q. lbs.		Tons. c. q. lbs.		Tons. c. q. lbs.		Tons. c. q. lbs.	
Ditto in Tons	19,250 1 1 11		18,208 8 0 25		19,976 1 3 21		29,545 7 2 27½		27,071 8 1 24		17,586 13 3 27½	
Average of three years.....	Maunds 522,981 = Tons 19,145.						Maunds 675,674 = Tons 24,734.					

To this may be added on account of Gunnies and Piece Goods, the weight of which cannot be ascertained from the returns, an estimated increase which would raise the Imports to about Tons 20,000.

STATEMENT.

PORT OF KA'RWA'R, EXPORTS AND IMPORTS

Statistical Return showing the Quantity and Value of Goods Imported

Description of Articles.	1866-67.				1867-68.			
	Import.		Export.		Import.		Export.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
1	2	3	4	5	6	7	8	9
		Rs.		Rs.		Rs.		Rs.
Brass ... ...Cwt.	7	448	1	94	202⅓	10,026	6¼	375
Chillies ... ... „	343¾	4,292	42¾	421	717½	5,034	86½	704
Coir ... ... „	10	78	843½	4,221	.....	.....	.....	6
Copper ... ... „	76	4,178	10	700	459½	26,575	33¼	1,778
Cotton ... ... „	2,683½	1,38,020	5,554¼	1,99,415	5,064	1,15,856	41,444	11,14,103
Date ... ... „	498½	3,076	276½	1,599	2,506½	8,850	779¾	1,777
Grain ... ... „	22,111	87,166	2,805½	17,829	16,892	49,670	3,113	8,570
Gunnies ... ... No.	125	56	.....	.....	3,477	1,666	.....	.....
Iron ... ...Cwt.	888	9,877	566	475	2,004½	29,324	8	598
Jagry ... ... „	196	1,787	213¾	217	478¾	3,990	81½	812
Lead ... ... „	2	30	3	30	5	105	.....	.....
Oil ... ... „	2,369¾	43,200	10,304½	33,602	1,928¼	37,065	441¼	8,122
Piece Goods ... ...No.	1,473	11,378	182	986	18,167	1,18,492	948	2,854
Silk and its Manufacture ...Lbs.	2	40	.....	.....	284	15,298	.....	.....
Specie (coins) value ... ... „	.....	2,12,546	.....	16,42,595	.....	2,10,200	.....	3,75,120
Steel ... ...Cwt.	5½	66	.....	.....	12	132	2	30
Sugar ... ... „	290¾	4,689	11¾	278	231	4,056	73	1,458
Tobacco ... ... „	340	4,146	10	464	471	6,631	13¼	181
	Cwt.		Lbs.		Lbs.		Lbs.	
Twist ... ...Lbs.	1	102	3	7	6,865	8,219	2,016	750
Sundries all other Goods value... „	.....	1,09,622	.....	60,158	.....	1,88,497	.....	9,93,291
Total.....	....	6,30,788	.....	19,63,091	.....	8,49,686	.....	25,70,529

Poona, 26th September 1872.

WEIGHT OF SUNDRIES, EXPORTED AND IMPORTED AT

STATEMENT showing the Quantity and Value of Sundries Imported and Exported at

	1866-67.				1867-68.			
	Import.		Export.		Import.		Export.	
	Quantity.	Value.	Quantity	Value.	Quantity.	Value.	Quantity.	Value.
		Rs.		Rs.		Rs.		Rs.
Kárwár ..... Cwts.	32,001	69,112	9,939	19,341	25,525	90,436	98,984	5,21,372
Kárwár ..... Value of Goods, the weight of which cannot be mentioned ...	.....	40,510	.....	40,817	.....	98,061	.....	4,71,919
Total.....	32,001	1,09,622	9,939	60,158	25,525	1,88,497	98,984	9,93,219
Sudushevghur Cwts.....	203	868	525	790	180	765	152	2,824
Sudushevghur Value of Goods, the weight of which cannot be mentioned ...	.....	3,453	.....	17,636	.....	2,256	.....	44,887
Total.....	203	4,321	525	18,426	180	3,021	152	47,711
Chundia ..... Cwts.....	.....	.....	.....	.....	315	419	923	52,141
Chundia ..... Value of Goods, the weight of which cannot be mentioned ...	.....	2,044	.....	781	.....	100	.....	540
Total.....	.....	2,044	.....	781	315	519	923	52,681

(Signed) S. D. SOUZA,
Manager of Customs, Kárwar.

FOR THE FIVE YEARS ENDING 1870-71.

and Exported at the Port of Kárwár during the 5 Years ending 1870-71.

1868-69.				1869-70.				1870-71.			
Import.		Export.		Import.		Export.		Import.		Export.	
Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
10	11	12	13	14	15	16	17	18	19	20	21
	Rs.		Rs.		Rs.		Rs.		Rs.		Rs.
104¼	4,456	18¼	440	.....	.....	14½	1,055	1,407½	56,870	12½	580
719	4,628	57½	415	.....	.....	156½	1,588	953¾	10,362	135¼	1,365
240¼	1,648	68	52	16½	66	65¼	239	135	991	85	385
380¾	20,297	82½	3,394	.....	.....	26¼	760	6,688¾	2,24,113	16½	622
12,720½	4,41,457	1,30,579¼	41,04,812	.....	...	1,38,820	58,32,333	32,434½	1,06,122	75,029	24,51,776
75	329	57	307	8,650½	2,26,296	.....	.....	1,755½	9,883	4½	50
19,867¼	57,153	8,924	14,581	26,491	132,591	5,336¼	25,744	41,053	1,73,181	1,584	6,903
				Bundles.				84,428		79,547¼	
1,23,793	33,821	95,530	6,122	114	1,750	13,21,458	12,893	50,904	12,211	88,173	4,040
4,034	53,019	3	36	7,174½	2,10,105	105¾	1,314	4,937	73,367	543¼	1,766
444¼	3,741	26½	209	.....	.....	265	2,476	621	5,491	13	104
12	184	.....	.....	.....	.....	19½	195	46¾	1,719	.....	.....
2,643¾	34,940	730	14,704	2,015	36,841	524	9,978	2,615½	38,444	244½	4,457
								8,219¼		801	
20,587	1,07,522	1,581	5,719	7,380	2,16,032	739	5,030	79,939	30,612	238	1,473
				Cwts.							
1,553	26,752	7	245	249	1,75,910	46	166	.....	1,28,331	.....	.....
.....	1,22,300	.....	4,13,715	.....	67,330	.....	3,01,883	.....	2,20,912	.....	1,99,450
43¼	812	.....	.....	.....	.....	1	12	62¼	1,206	.....	.....
383¼	3,119	30¾	719	1,837½	27,080	34	545	1,077½	30,554	23¾	564
511¼	9,309	34	550	567	8,028	32	632	544¼	9,376	26¼	459
								1,684		50 Cwts.	
229¾	23,696	.....	.....	1,532	3,70,781	1,424	7,030	2,35,236	2,54,643	50	3,329
.....	2,05,936	.....	22,250	.....	2,45,968	.....	43,777	.....	7,13,260	.....	39,269
.....	11,55,792	.....	45,89,341	.....	28,18,778	.....	6,247,650	.....	23,77,048	.....	27,16,612

C. PRITCHARD,
Acting Collector of Salt Revenue.

KA'RWA'R AND MINOR PORTS SUDASHEVGHUR AND CHUNDIA.

the following different ports in the Kárwár Taluka during the last 5 *Years ending* 1870-71.

1868-69.				1869-70.				1870-71.			
Import.		Export.		Import.		Export.		Import.		Export.	
Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Rs.		Rs.		Rs.		Rs.		Rs.		Rs.
33,215	1,41,513	2,465	8,127	29,321	1,31,243	11,326	34,552	87,823	6,09,157	10,232	27,168
.....	64,423	.....	14,123	.....	1,14,725	.....	9,22	.....	1,04,103	.....	12,121
33,215	2,05,936	2,465	22,250	29,321	2,45,968	11,328	43,777	87,823	7,10,260	10,232	39,289
555	3,380	112	283	367	1,066	11,100	4,610	424	3,007	21,518	13,083
.....	1,391	.....	18,848	.....	865	.....	36,595	.....	4,318	.....	28,251
555	4,771	112	19,131	367	1,931	11,100	41,205	424	7,325	21,518	41,334
163	1,115	179	435	.....	.....	252	334	.....	.....	429	598
.....	525	.....	690	.....	.....	.....	.....	.....	.....	.....	.....
163	1,640	179	1,125	.....	.....	252	334	.....	.....	429	598

(Signed) E. PRATT,
Assistant Commissioner of Customs, Kanara

PORT OF HONORE, EXPORTS AND IMPORTS,

STATEMENT showing the Quantity and Value of Goods Imported and Exported at the

Description of Articles.	1866-67.				1867-68.			
	Import.		Export.		Import.		Export.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
1	2	3	4	5	6	7	8	9
		Rs.		Rs.		Rs.		Rs.
Brass ... ... Cwts.	5	342	3½	265	9⅓	595	.....	.....
Chillies ... ... „	48¼	3,326	205½	3,603	145⅝	1,095	119¾	826
Coir... ... ... „	...	.....	2,400	11,290	24¾	138	2,678¾	10,884
Copper ... ... „	118¾	7,538	159⅓	8,027	106¼	4,851	32	2,681
Cotton ... ... „	4	181	13½	525	88½	1,620	86	1,720
Dates ... ... „	385	1,522	13½	92	832	3,445	1¼	5
Grains ... ... „	9,697	54,137	28,126	86,404	14,720	45,367	33,448	99,681
Gunnies ... ... Nos.	3,795	1,407	451	139	6,111	1,652	665	190
Iron... ... ... .Cwts.	23	196	.....	.....	156	881	11½	75
Jagry ... ... „	223¼	1,592	206	1,762	298	3,826	537	4,772
Lead ... ... „	9	155	.....	.....	1¼	32	.....	.....
Oil ... ... „	1,071	20,268	90¼	3,184	1,593¾	27,480	97¾	2,165
Piece Goods ... ... Yards.	33,500	13,605	16,352	8,822	31,300	8,028	13,303	4,898
Silks and its Manufacture ... ... „	330	282	20	40	10	8	.....	.....
Specie (coins) ... ... Value.	.....	6,306	.....	13,674	.....	2,700	.....	10,635
Steel ... ... .Cwts.	.....	.....	.....	.....	.....	.....	.....	.....
Sugar ... ... „	125	2,174	.....	.....	144¼	2,926	¾	3
Tobacco ... ... „	215½	3,526	194¾	2,157	499	8,592	285	4,637
Twist ... ... Lbs.	60	32	.....	.....	302	152	.....	.....
Sundries (all other Goods)... Value.	.....	1,05,549	.....	1,34,422	.....	1,23,230	.....	1,96,146
Total.....Rs.	.....	2,22,098	.....	2,74,406	.....	2,36,614	.....	3,39,338

Poona, 26th September 1872.

COOMPTA, TALUKA HONORE, EXPORTS AND IMPORTS

STATEMENT showing the Quantity and Value of Goods Imported and Exported

Description of Articles.	1866-67.				1867-68.			
	Import.		Export.		Import.		Export.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
1	2	3	4	5	6	7	8	9
		Rs.		Rs.		Rs.		Rs.
Brass ... ...Cwts.	1,297	58,144	272	4,355	1,559	48,696	527¾	8,446
Chillies ... ... „	463¾	5,129	1,651¼	12,900	138	937	6,180	30,03
Coir... ... ... „	2,053	9,826	1,158¼	2,795	7,265½	7,847	199¾	80
Copper ... ... „	5,015¼	2,62,897	1,375¼	33,125	679	39,910	847	22,38
Cotton ... ... „	18,221	6,875	1,66,586	69,00,095	182	2,225	3,54,602	84,23,74
Dates ... ... „	16,470	86,533	1,922⅓	13,621	12,766	70,861	3,105¾	14,46
Grain ... ... Ind. Mds.	1,15,660	4,36,602	41,999	2,19,349	27,343½	1,16,305	13,899½	69,80
Gunnies ... ... Nos.	10,01,294	1,58,799	72,291	9,728	8,85,430	1,52,979	75,998	7,91
Iron... ... ... Cwts.	6,572¼	39,919	499	5,513	6,465¾	56,902	178	1,67
Jagry ... ... „	1,744	9,002	252	2,373	778¼	5,395	2,563¾	16,87
Lead ... ... „	709	15,426	62	756	1,040	21,408	48	1,03
Oil ... ... „	9,514	2,62,132	1,833¼	47,035	15,529	2,17,515	1,883	38,57
Piece Goods ... ... Pieces.	15,20,294	4,16,698	1,22,210	1,35,676	4,56,676	3,90,501	30,864	1,02,56
Silk do. ... ... „	7,434	57,131	307	1,410	7,514	48,165	620	7,41
Silk... ... ... Lbs.	3,295	17,747	.....	.....	5,343	25,400	.....	.....
Specie (coins) ... ... Value.	.....	39,43,043	.....	75,412	.....	66,51,800	.....	1,39,03
Steel ... ... Cwts.	276½	3,368	17	239	480	4,898	12¼	16
Sugar ... ... „	5,445½	92,783	404	8,396	4,719½	84,180	1,549¾	14,45
Tobacco ... ... „	1,304¾	49,911	378	4,713	1,743	30,336	213	4,41
Twist ... ... Lbs.	1,23,374	1,26,423	27,629	26,457	2,34,555	2,39,892	86,506	40,56
Sundries (all other Goods)... Value.	.....	3,63,791	.....	1,02,10,596	.....	4,25,856	.....	13,67,76
Total.....Rs.	.....	64,22,179	.....	1,33,93,262	.....	86,42,008	.....	1,03,12,18

Poona, 26th September 1872.

FOR THE FIVE YEARS ENDING 1870-71.

Port of Honawar, Taluka Honawar, Zillah Kanara, during the 5 *Years ending* 1870-71.

1868-69.				1869-70.				1870-71.			
Import.		Export.		Import.		Export.		Import.		Export.	
Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
10	11	12	13	14	15	16	17	18	19	20	21
	Rs.		Rs.		Rs.		Rs.		Rs.		Rs.
15½	1,046	13	20	8¾	476	7½	597	21	1,009	¾	70
475½	3,228	86¼	570	402¾	3,813	187¼	2,430	342	2,888	180	2,496
224½	1,246	2,844	12,271	134	742	2,821	13,366	9	65	2,058	9,138
117	1,723	96¾	5,511	197½	10,182	94¾	5,222	102½	5,064	9¾	337
3	72	.....	.....	72½	2,866	70½	2,820	1¼	23	.....	.....
219¼	1,284	10	80	1,036¼	3,152	289¾	1,211	712	2,837	47¼	181
13,065	48,202	44,185	1,32,523	18,325	81,421	24,752¾	1,59,304	19,573	92,114	15,679	63,304
4,219	1,056	714	190	7,370	1,634	395	150	5,709	1,090	1,150	128
155½	1,708	12¼	161	84¾	732	64½	701	97¾	688	35¼	375
205¾	1,888	277¼	1,504	105¼	440	276½	2,495	68¾	463	344	1,874
4½	63	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1,257½	22,822	426½	7,656	1,002¼	17,422	91¾	1,774	2,416	43,944	242	5,088
1,32,643	28,653	1,24,088	28,025	27,787	12,169	32,744	7,900	56,934	15,472	71,154	19,739
470	1,401	530	511	13	28	.....	.....	.....	.....	.....	.....
.....	5,000	.....	1,450	.....	195	.....	5,000	.....	1,201	.....	2,280
7	81	.....	.....	.....	.....	.....	.....	8½	130	.....	.....
175¼	3,322	.....	.....	221	2,590	10¾	226	125¼	2,590	.....	.....
628¼	11,639	271	5,484	130¾	2,777	411½	5,943	219¼	3,514	272	3,708
35	17	4	2	.....	.....	.....	.....	143	34	.....	.....
.....	1,52,984	.....	2,80,256	.....	72,469	.....	1,06,169	.....	78,407	.....	1,08,602
.....	2,95,435	.....	4,76,213	.....	2,63,108	.....	3,15,308	.....	2,51,533	.....	2,17,320

C. PRITCHARD,
Acting Collector of Salt Revenue.

FOR THE FIVE YEARS ENDING 1870-71.

at the Port of Coompta, Taluka Honawar, during the 5 *Years ending* 1870-71.

1868-69.				1869-70.				1870-71.			
Import.		Export.		Import.		Export.		Import.		Export.	
Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
10	11	12	13	14	15	16	17	18	19	20	21
	Rs.		Rs.		Rs.		Rs.		Rs.		Rs.
1,761¾	18,837	38¼	2,334	373½	16,420	538	9,415	685	40,840	30¾	1,970
163¼	1,307	6,902⅜	44,572	123	1,032	4,125	41,106	145	1,305	3,121	30,355
2,189½	14,215	660¼	2,931	1,129½	5,650	892¼	4,320	1,088	5,140	1,555	5,572
5,315¼	1,52,449	492	24,863	2,111¾	91,881	618⅜	3,930	3,158	1,54,216	298	19,072
1,212¾	29,965	3,23,577½	1,02,97,695	439½	11,416	2,33,413¼	94,65,345	619¼	24,180	1,47,174½	49,04,847
6,652	36,104	1,122	4,746	4,548	27,288	2,150¾	12,905	5,394	22,576	1,018	4,216
26,639	1,06,012	39,884	1,45,315	61,618	1,97,622	21,006½	84,025	86,399	1,70,698	25,648	85,870
1,44,942	2,16,822	10,525	2,987	10,39,269	1,49,283	12,129	3,459	8,42,144	1,44,505	1,17,422	22,130
2,268¾	46,028	36	1,213	1,917⅓	38,258	216	3,856	3,418½	41,022	171	1,766
423½	3,936	782½	4,293	829½	5,250	569½	2,947	565¼	2,826	1,310	8,604
1,315¾	20,963	99	1,537	649	10,432	115	2,017	812½	12,180	62	1,110
8,956	2,11,373	1,635	34,514	6,506	1,31,120	1,745	35,949	7,815	1,41,685	1,165	24,178
2,68,609	3,64,891	1,18,494	1,10,389	2,92,496	2,23,897	98,963	75,942	1,96,895	2,03,498	1,40,280	95,400
9,926	52,492	901	3,998	4,254	34,391	612	2,415	3,698	580	312	560
14,575	74,075	.....	.....	12,147	60,292	.....	.....	11,845	55,890	.....	.....
.....	56,70,782	.....	1,36,835	.....	45,58,468	.....	2,15,498	.....	42,65,250	.....	1,44,150
487⅕	5,070	65	940	206½	2,509	45	815	315¼	3,455	62½	824
3,949¾	60,606	2,506	22,178	4,029½	62,172	898¾	16,725	3,818¼	66,315	528	7,615
1,924½	42,093	153¼	6,635	1,828¼	43,734	195	4,195	1,158	25,928	316¾	4,915
2,77,767	2,04,820	37,186	15,444	2,30,759	1,92,548	40,196	18,615	2,80,592	2,08,980	23,352	10,125
.....	4,36,220	.....	14,70,082	.....	4,15,243	.....	22,15,120	.....	6,15,916	.....	15,48,950
.....	78,19,387	.....	1,23,33,501	.....	62,68,906	.....	1,22,19,529	.....	62,36,979	.....	69,22,229

C. PRITCHARD,
Acting Collector of Salt Revenue.

WEIGHT OF SUNDRIES EXPORTED AND IMPORTED AT COOMPTA AND

STATEMENT showing the Quantity and Value of Sundries Imported and Exported at the ending 1870-71, *as per order from the*

Names of the Ports.		1866-67.				1867-68.			
		Import.		Export.		Import.		Export.	
		Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
			Rs.		Rs.		Rs.		Rs.
Coompta	Cwts.	20,329¾	2,15,126	49,912	10,136,424	25,992	3,03,871	57,122	13,51,431
	No.	25,75,980	70,406	6,34,370	23,274	23,06,686	92,065	3,570	666
	Gallons.	1,948	8,830	60	240	1,482½	7,704	40	220
	Value.	.....	69,429	.....	50,658	.....	22,216	.....	15,447
Total		.....	3,63,791	.....	10,210,596	.....	4,25,856	....	13,67,764
Honore	Cwt.	25,981½	74,765	8,641¾	108,693	31,154	93,400	20,075	1,76,894
	No.	10,75,915	30,512	4,77,564	22,712	8,49,472	26,499	4,48,008	17,304
	Value.	.....	272	.....	3,017	.....	3,337	.....	1,948
Total Rs.....		.....	1,05,549	.....	1,34,422	.....	1,23,230	.....	1,96,146
Moodeshwur .	Cwt.	321¾	4,559	480½	2,505	391¼	2,852	853¼	2,040
	No.	12,870	4,115	60,617	1,525	9,121	7,402	1,01,773	2,212
Total		.....	8,674	.....	4,030	.....	10,254	.....	4,252
Butkul.....	Cwt.	2,013¼	10,063	2,011	10,405	2,505	12,190	3,925	19,641
	No.	2,00,225	5,012	3,66,434	9,165	2,36,000	5,900	6,88,856	17,251
Total		.....	15,075	.....	19,570	.....	18,090	.....	36,892
Sheerally.....	Cwt.	260	1,005	1,637	8,385	240	980	1,816	9,483
	No.	22,900	572	2,82,600	7,065	34,893	869	3,14,600	7,865
Total		.....	1,577	.....	15,450	.....	1,849	.....	17,348

MINOR PORTS OF HONORE, MOORDHESUR, BHUTKUL, SHEERALLY.

following different Ports in the Honore Taluka, Zillah Kanara, during the last 5 years Assistant Commissioner of Customs, Kanara.

1868-69.				1869-70.				1870-71.			
Import.		Export.		Import.		Export.		Import.		Export.	
Quantity.	Value.	Quantity.	Value.	Quantity	Value.	Quantity.	Value.	Quantity	Value.	Quantity.	Value.
	Rs.		Rs.		Rs.		Rs.		Rs.		Rs.
28,218	3,27,210	64,057	14,50,157	26,110	3,24,258	67,514	21,90,680	17,846½	5,51,782	71,761½	15,30,610
21,27,861	73,089	1,01,329	2,445	17,00,861	59,498	2,74,827	4,152	12,57,940	28,572	2,57,021	3,222
2,777	4,509	97	611	3,179	5,232	228	1,368	2,520½	5,437	102	520
.....	31,412	.....	16,869	.....	26,255	.....	18,918	.....	30,119	.....	14,598
.....	4,36,220	.....	14,70,082	.....	4,15,243	.....	22,15,120	.....	6,15,910	.....	15,48,950
31,050	1,10,719	23,333	2,50,225	10,107¾	44,566	16,905½	88,042	2,816¼	60,266	12,446¼	93,605
15,12,687	34,886	9,31,470	28,807	14,60,656	27,144	9,11,966	16,869	13,56,773	18,075	34,43,006	14,889
.....	7,379	.....	1,224	.....	759	.....	1,258	.....	66	.....	108
.....	1,52,984	.....	2,80,256	.....	72,469	.....	1,06,169	.....	78,407	.....	1,08,602
138¾	750	215¼	1,203	139¼	1,553	356½	3,890	117	821	18¾	115
8,455	317	67,947	1,860	12,306	1,530	83,162	1,703	6,665	1,080	75,515	2,057
.....	967	.....	3,063	.....	3,083	.....	5,593	.....	1,901	.....	2,172
2,005	10,603	6,587	30,249	1,533¼	7,893	4,977	24,753	1,025	5,499	1,486	7,959
2,32,432	5,812	11,23,589	28,902	1,72,998	4,335	9,26,184	23,156	1,13,283	2,891	2,40,011	6,001
.....	16,415	.....	59,151	.....	12,228	.....	47,909	.....	8,930	.....	13,960
174	834	2,034	10,854	56	299	695	3,460	60	300	1,095	5,487
1,985	494	3,51,773	8,793	5,834	147	1,18,785	2,984	6,185	161	2,15,213	5,934
.....	1,328	.....	19,647	.....	446	.....	6,444	...	461	.....	10,881

(Signed) E. PRATT,
Assistant Commissioner of Customs.

MEMORANDUM.

Port of Honore.

The total value of imports and exports in 1870-71, exclusive of the item of sundries was
A B C
Rs. 2,81,844. Of this sum Rs. 2,41,900 was the value of goods which weighed 42,564 cwts. The difference between A and B, Rs. 39,944, was the value of goods which are not commonly weighed. Forming a very rough estimate of their gross weight, we assume that the total weight of the imports and exports in 1870-71 amounted to (B : C :: A :) cwts. 49,572½, which multiplied by 5 gives the aggregrate weight of imports and exports in the 5 years ending 1870-71 as cwts. 247,962½.

Port of Compta.

The total value of the imports and exports in 1870-71, exclusive of the items of sundries
A B C
was Rs. 1,09,94,348. Of this sum Rs. 58,13,280 was the value of goods which weighed 254, 66. cwts. The difference between A and B, Rs. 51,81,068, was the value of goods which are not commonly weighed. Forming a very rough estimate of their gross weight, we assume that the total weight of the imports and exports in 1870-71 amounted to (B : : C : A :) cwts. 481,640, which multiplied by 5 gives the aggregrate estimated weight of imports and exports in the 5 years ending 1870-71 as cwts. 24,08,200.

Port of Kárwár

The total value of imports and exports in 1870-71, exclusive of the item of sundries, was
A B C
Rs. 43,41,111. Of this sum Rs. 32,10,710 was the value of goods which weighed 170,849 cwts. The difference between A and B, Rs. 11, 30,401, was the value of goods which are not commonly weighed. Forming a very rough estimate of their gross weight, we assume that the total weight of the imports and exports in 1870-71 amounted to (B : : C : : A :) cwt. 231,000 which multiplied by 5 gives the aggregate estimated weight of imports and exports in the 5 years ending 1870-71 as cwts. 1,155,000.

The estimated gross weight of the traffic of the three chief ports in Kanara for 5 years is then 3,811,162½ cwts.

This does not include the weight of the articles classed under sundries, respecting which separate statement has been submitted.

Nor does it include the traffic of the ports of Butkul, Sheeraly, Murdheswar, Tuddry Ankola, Gungawuly, Belikerry, Sudasewghur and Chindia, the returns respecting which are not at present in this office. Very little of the traffic of these ports however would use any railway into the interior, the imports being chiefly for consumption in the country between the Ghauts and the sea, and the exports being the produce of the same tract of country.

From the figures above given in respect to the traffic of the three chief ports in Kanara, I would moreover make a deduction of at least 5 per cent. for purely local traffic.

(Signed) E. PRATT,
Assistant Commissioner, Kanara Range.

(True Copy.)
C. PRITCHARD,
Acting Collector of Salt Revenue.

MEMORANDUM.

Honore Taluka.

Coompta, Honore, Murdheswar, Butkul, Sheeraly.

The total value of the imported and exported sundries in 1870-71 amounted to A Rs. 22,89,634. Of this total Rs. 22,56,444 was the value of certain goods which weighed B C 1,08,672 cwts. The difference between A and B, Rs. 33,190, was the value of goods which are not commonly weighed. Forming a rough estimate of their gross weight, we assume that the total weight of imported and exported sundries in 1870-71 amounted to (B : C : : A :) cwts. 1,10,270$\frac{1}{5}$, which multipled by 5 gives the aggregate estimated weight of imported and exported sundries in the 5 years ending 1870-71 as cwts. 5,51,351.

Kárwár and Ankolá Talukas.

Kárwár, Sudashewghur, Chindia, Belikery, Ankola, Gungawuly, and Tuddry.

The total value of the imported and exported sundries in 1870-71 amounted to A Rs. 8,53,679. Of this total Rs. 6,53,013 was the value of certain goods which weighed B C 1,20,426 cwts. The difference between A and B, Rs. 2,00,666, was the value of goods which are not commonly weighed. Forming a very rough estimate of their gross weight, we assume that the total weight of the imported and exported sundries in 1870-71 amounted to (B : C : : A :) cwts. 1,57,432; which multipled by 5 gives the aggregate estimated weight of imported and exported sundries in the 5 years ending 1870-71 as cwts. 7,87,160.

(Signed) E. PRATT,
Assistant Commissioner, Kanara Range.

(True Copy.)
C. PRITCHARD,
Acting Collector of Salt Revenue

STATEMENT showing the quantity of Cotton in cwts. Imported and Exported at each of the Ports named for Five Years ending with 1870-71, *extracted by the Committee from returns furnished by the Acting Collector, Salt Revenue.*

	1866-67.		1867-68.		1868-69.		1869-70.		1870-71.	
	Import.	Export.	Import.	Export.	Import.	Export.	Import.	Export.	Import.	Export.
*Coompta	102½	166,586	182	354,602	1,212⅔	323,577	439½	233,413¼	619½	147,174
Kárwár	2,683½	5,554¼	5,064	41,444	12,720⅓	130,579¼	.....	138,820	32,434	75,029
†Vengurla	.....	28,121	610	84,390	11½	126,184	.....	90,141	.....	45,722
Total	.....	200,261¼	.....	480,436	.....	580,340¼	.....	462,374¼	.....	267,925

	Tons.
Average export for the 5 years in tons	19,913
For 1871-72. The exports of cotton from Vengurla have reached cwts.	114,000 = 5,700
From 30th June 1871 to 1st July 1872 the Cotton exports of Kárwar have been ascertained to reach cwts...	210,000 = 10,500
The exports of Compta not yet ascertainable for 1872.	

* It should be noted that of the exports from Coompta of 1870-71, cwts. 32,434 were imported at Kárwár for re-exportation.

† Only a portion of the Vengurla cotton exports can be expected to be carried by the Kárwár Railway.

STATEMENT showing the Estimated Area in Square Miles and Population of Districts or parts of Districts which Produce Cotton likely from position relative to the Kárwár Railway to be carried by it, drawn up by the Revenue Commissioner S. D.

Name of Districts.	Area in Square Miles.	Population.	Cotton producing Area in Acres of which about ⅓ under Cotton by Rotation.	Remarks.
Dharwar Collectorate about ⅘ area	4,200	690,000	16,00,000	
Dharwar Jagheers	732	111,558	4,00,000	
Kaládgi Collectorate about $\frac{7}{24}\frac{1}{4}$ area	2,236	339,400	7,60,000	
Belgaum Collectorate about ⅛ area	574	105,300	61,800	
Raichore Doab of His Highness the Nizam's territory, part of, by rough Estimate	2,520	302,400	7,00,000	
Bellary Collectorate, part of, by rough Estimate	2,720	299,200	3,20,000	
Total.....	13,082 = 83,72,480 ares.	1,847,898	38,41,800 = 6,003 square miles.	

STATEMENT.

STATEMENT of Area under Cotton, both Indigenous and Exotic, in the Cotton 1871-72 ; *showing also Average Area and Average Produce in Tons for from Returns of Area furnished by the*

Talooka.	1869-70.		1870-71.		1871-72.	
	Indigenous Acres.	Exotic Acres.	Indigenous Acres.	Exotic Acres.	Indigenous Acres.	Exotic Acres.
1	2	3	4	5	6	7
Hubli	14,229	60,020	12,211	46,351	11,810	50,222
Dharwar	23,625	7,200	18,720	2,247	16,460	1,837
Nowlgoond	80,142	56,784	72,886	39,976	69,932	36,217
Dummul	25,750	91,605	25,524	75,940	32,701	75,648
Bunkapoor	5,500	38,004	4,814	31,934	5,533	31,351
Ranebednoor	6,936	34,955	5,936	26,881	9,211	24,442
Hangul	6,382	3,582	5,339	3,074	5,186	2,452
Kurujgee...	8,642	59,706	8,469	50,104	11,036	45,184
Kulghutgee	2,329	211	961	35	719	7
Roan	41,620	58,456	33,757	48,342	34,197	38,422
Kode	4,199	4,097	3,738	2,613	4,006	2,460
Total.....	2,19,354	4,14,620	1,92,355	3,27,497	2,00,791	3,08,242
Native States	24,462	68,253	24,496	69,431	23,987	74,308
Total Dharwar, Government and Native States	2,43,816	4,82,873	2,16,851	3,96,928	2,24,778	3,82,550
Sumpgaum	22,774	1,041	20,416	417	19,681	143
Purusghur	29,000	5,500	41,163	12,552	47,071	7,075
Belgaum Total.....	51,774	6,541	61,579	12,969	66,752	7,218
Moodebehal	50,286	554	65,545	147	58,450	4
Bagewadee	58,342	.....	59,949	.....	44,311	.....
Beejapoor	38,577	.....	24,880	.....	13,416	.....
Bagulkote	38,027	2,089	53,979	2,128	52,538	2,570
Badamee	14,699	2,400	19,728	2,357	18,111	1,426
Hoongoond	53,853	9,809	73,377	7,242	76,773	4,792
Kuladgee Total	2,53,784	14,852	2,97,458	11,874	2,63,599	8,792
Part of Nizam's Territory ...	.....	.....	.....	.....	.....	.....
Part of Bellary	.....	.....	.....	.....	.....	.....

Note.—Those parts only of Belgaum, Kaladgi, the Nizam's Territory and Bellary, which are

Fields feeding the Ports of Kárwár and Koompta, for the (3) *three Years ending those three Years, compiled in the Office of the Survey Commissioner, S.D., Local Revenue Officers.*

Average of (3) three Years.		Indigenous Tons.	Exotic Tons.	Estimated Produce lb. per Acre.	Total Tons.	Portion tending naturally to Koompta and Kárwár. Tons.	Portion which probably may go elsewhere than to Koompta or Kárwár. Tons.
Indigenous Acres.	Exotic Acres.						
8	9	10	11	12	13	14	15
12,750	52,198	284	1,748	75 lbs. clean Cotton per Acre Exotic. 50 lbs. clean Cotton per Acre Indigenous.	2,032	2,032	.....
19,602	3,761	438	126		564	564	.....
74,320	44,326	1,659	1,484		3,143	3,143	.....
27,992	81,064	625	2,714		3,339	3,339	.....
5,282	33,763	118	1,130		1,248	1,248	.....
7,361	28,759	164	963		1,127	1,127	.....
5,636	3,036	126	102		228	228	.....
9,382	51,665	209	1,730		1,939	1,939	.....
1,336	84	30	3		33	33	.....
36,525	48,407	815	1,621		2,436	2,436	.....
3,981	3,057	89	102		191	191	.....
2,04,167	3,50,120	4,557	11,723		16,280	16,280	.....
24,315	70,664	543	2,366		2,909	2,909	.....
2,28,482	4,20,784	5,100	14,089		19,189	19,189	.....
20,957	533	468	18		486	200	216
39,078	8,376	872	280		1,152	1,000	152
60,035	8,909	1,340	298		1,638	1,200	368
58,094	235	1,037	8	75 lbs. per Acre Exotic. 50 lbs. Indigenous excepted in 3 first Talookas 40 lbs.	1,045	400	645
54,201	.....	968	.....		968	400	568
25,624	.....	458	.....		458	200	258
48,181	2,262	1,075	76		1,151	1,151	.....
17,512	2,061	391	69		460	460	.....
68,001	7,281	1,518	244		1,762	1,762	.....
2,71,613	11,839	5,447	397		5,844	4,373	1,471
.....	.....	.....	.....	.....	.....	4,000	.....
.....	.....	.....	.....	.....	.....	1,200	.....
						5,200	.....
				Grand Total.....		29,962	1,839

considered to feed the ports of Kárwár and Koompta, are included in this statement.

W. C. ANDERSON,
Survey Commissioner, S. D.

Estimate for Working Traffic suggested to the Committee, as per Mr. Havelock's letter No. 20 B of 1872.

Gross Ton Mileage	22,751,889
Train Mileage	167,010
Engine Mileage	188,415

Maintenance of way and works. Rs. 904 per mile.	Engineers' Salaries	at Rs. 240 per Mile	34,560		
	Inspectors	„ „ 160 „	25,640		
	Office Expenses	„ „ 50 „	5,200		
	Permanent Way Wages	„ 130 pies per 1,000 T. miles	15,405		
	Do. Materials	„ 100 „	11,850		
	Bridges and Tunnels	„ 80 per Mile	11,520		
	Stations	„ 80 „	11,520		
	Miscellaneous	„ 100 „	14,400		
					1,30,095
Locomotive, Rs. 666 per mile.	Supervision	„ 50 „	7,200		
	Foremen	„ 80 „	11,520		
	Office	„ 20 „	2,880		
	Running Drivers	„ Rs. 16 per Engine miles.	30,146		
	Do. Fuelling, Cleaning	„ „ 03 „	5,652		
	Fuel (at Rs. 4 per ton)	„ 175 pies per 1,000 T. miles	20,737		
	Water	„ 20 „	2,370		
	Oil and Tallow	„ 20 „	2,370		
	Maintenance Wages	„ 80 „	9,480		
	Materials do.	„ 30 „	3,555		
					95,910
Carriage and Waggon Rs. 194 per mile.	Supervision	„ 30 per mile	4,320		
	Foremen	„ 30 „	4,320		
	Office	„ 15 „	2,160		
	Repairs, Wages	„ 60 pies per 1,000 T. miles	7,110		
	Do. Materials	„ 60 „	7,110		
	Cleaning and Oiling, Wages	„ 12 „	1,422		
	Do. Materials	„ 12 „	1,422		
					27,864
Traffic Rs. 520 per mile.	Superintendence	„ 120 Rs. per mile	17,280		
	Office and Contingencies	„ 50 „	7,200		
	Station Staff	„ 150 per 1,000 Ton miles.	17,775		
	Train Staff	„ Rs 04 per Train mile	6,688		
	Fuel, Lighting, Stores, &c	„ „ 100 per mile	14,400		
	Clothing	„ „ 20 „	2,880		
	Printing, Stationery, Tickets, &c	„ „ 60 „	8,640		
					74,863
General charges Rs. 469 per mile.	Auditor, Accountant and Pay Department	at Rs. 100 per mile	14,400		
	Store Department	„ „ 50 „	7,200		
	Medical „	„ „ 40 „	5,760		
	Stationery Contingencies	„ „ 25 „	3,600		
	Police	„ „ 100 „	14,400		
	Advertizing	„ „ 4 „	576		
	Telegraph, Salaries	„ „ 100 „	14,400		
	Do. Maintenance	„ „ 50 „	7,200		
					67,536
Special Rs. 272 per mile.	Compensation	„ „ 40 pies per Ton of Load	1,402		
	Fire Insurance	„ „ 50 „	1,752		
	Permanent Way Renewal Fund	„ „ 250 per mile	36,000		
					39,154
				Total Rs.	4,35,422

Total Rs. 3,025 per mile.

(Signed) A. W. FORDE,
Mem. Inst. C.E.

STATEMENT.

Data for Calculat-

To KA'RWAR'.

	Cotton.	General Merchandise.	Timber.	Local.
	Tons.	Tons.	Tons.	Tons.
January ...	.....	930	1,080	310
February	.....	840	960	280
March ...	2,850	310	310	310
April ...	4,800	300	300	300
May ...	4,960	.....	620	310
June ...	2,880	.....	.....	.....
July ...	.....	.....	620	.....
August ...	.....	.....	620	.....
September	.....	.....	600	.....
October ...	1,302	.....	.....	155
November	2,304	.....	.....	300
December	930	310	310	310
Tons.				
Exclusive of Local.....28,174				
Total.....	20,064	2,690	5,420	2,273

From GADDAK

Months.	Engines.			Passenger Traffic.								Cotton.						
				Carriages.				Passengers.				Waggons.				Goods.		
	Tons.	Miles.	T. miles.	No.	Tons.	Miles.	T. miles.	No.	Tons.	Miles.	T. miles.	No.	Tons.	Miles.	T. miles.	Tons.	Miles.	T. miles.
January Mixed..	24	4,480	107,520	7	21	4,480	94,080	132	8	4,480	35,840	..	..	..	....	..	..	....
February M.....	24	4,046	97,104	7	21	4,046	84,966	..	8	4,046	32,368	..	..	..	....	..	..	....
March M.....	24	4,480	107,520	7	21	4,480	94,080	..	8	4,480	35,840	28	70	4,480	317,600	56	4,480	250,880
,, Special..	24	4,480	107,520	1 B	3	4,480	13,440	..	..	..	....	18	45	4,480	201,600	36	4,480	161,280
April M.	24	4,335	104,040	7	28	4,335	91,035	132	8	4,335	34,680	28	70	4,335	303,450	56	4,335	242,520
,, S.	24	4,335	104,040	1 B	3	..	13,005	..	..	..	....	18	45	4,335	195,075	36	4,335	156,060
,, S.	24	4,335	104,040	1 B	3	..	13,005	..	..	..	....	34	85	4,335	368,475	68	4,335	294,780
May M.	24	4,480	107,520	7	21	4,480	94,080	132	8	4,480	35,840	28	70	4,480	317,600	56	4,480	250,880
,, S.	24	4,480	107,520	1 B	3	..	13,440	..	..	..	....	18	45	4,480	201,600	36	4,480	161,280
,, S.	24	4,480	107,520	1 B	3	..	13,440	..	..	..	....	34	85	4,480	380,800	68	4,480	304,700
June M.	24	4,335	104,040	7	21	4,335	91,035	132	8	4,335	34,680	28	70	2,167	151,690	56	2,167	121,352
,, S.	24	2,167	52,020	1 B	3	2,167	6,501	..	..	..	....	34	85	2,167	184,195	68	2,167	147,356
,, S.	24	2,167	52,020	1 B	3	2,167	6,501	..	..	..	....	34	85	2,167	184,195	68	2,167	147,356
July M.	24	4,480	107,520	7	21	4,480	94,080	132	8	4,480	35,840	..	..	..	....	..	..	....
August M.	24	4,480	107,520	7	21	4,480	94,080	132	8	4,480	35,840	..	..	..	....	..	..	....
September M.	24	4,335	104,040	7	21	4,335	91,035	132	8	4,335	34,680	..	..	..	....	..	..	....
October M.	24	4,480	107,520	7	21	4,480	94,080	132	8	4,480	35,840	21	52½	4,480	235,200	42	4,480	188,160
November M.	24	4,335	104,040	7	21	4,335	91,035	132	8	4,335	34,680	21	52½	4,335	226,587	42	4,335	182,070
,, S.	24	4,335	104,040	1 B	3	..	13,005	..	..	..	....	18	45	4,335	195,075	36	4,335	156,060
December M.	24	4,480	107,520	7	21	4,480	94,080	132	8	4,480	35,840	15	37½	4,480	168,000	30	4,480	134,400
		83,505	2,004,624				1,203,003			52,746	421,968				3,631,142			2,899,134

From KA'RWA'R

												Salt.						
January M.	24	5,844	140,256	7	21	4,480	94,080	132	8	4,480	35,840	6	15	4,480	67,200	30	3,720	111,600
February M.....	24	4,046	97,104	7	21	4,046	84,966	132	8	4,046	32,368	8	20	4,046	80,920	40	3,360	134,400
,, M	24	1,232	29,568															
March M.....	24	5,844	140,256	7	21	4,480	94,080	132	8	4,480	35,840	6	15	4,480	67,200	30	3,720	111,600
,, S.	24	5,844	140,256	1 B	3	4,480	13,440	..	..	..	....	9	22½	4,480	100,800	45	3,720	167,400
April M. ...	24	5,655	135,720	7	21	..	91,035	132	8	4,335	34,680	6	15	4,335	65,025	30	3,600	108,000
,, S.	24	5,655	135,720	1 B	3	..	13,005	..	..	..	....	10	25	4,335	108,375	50	3,600	180,000
,, S.	24	5,655	135,720	1 B	3	..	13,005	..	..	..	....	10	25	4,335	108,375	50	3,600	180,000
May M.....	24	5,844	140,256	7	21	4,480	94,080	..	8	4,480	35,840	6	15	4,480	67,200	30	3,600	108,000
,, S.	24	5,844	140,256	1 B	3	..	13,440	..	..	..	....	..	..	..	....	..	..	....
,, S.	24	5,844	140,256	1 B	3	..	13,440	..	..	..	....	6	15	4,480	67,200	30	3,600	108,000
June M.....	24	5,655	135,720	7	21	4,335	91,035	132	8	4,335	34,680	..	..	..	....	..	..	....
,, S.	24	5,655	135,720	1 B	3	..	6,501	..	..	..	....	..	..	..	....	..	..	....
,, S.	24			1 B	3	..	6,501	..	..	..	....	..	..	..	....	..	..	....
July M.	24	4,480	107,520	7	21	4,480	94,080	132	8	4,480	35,840	..	..	..	....	..	..	....
August M.....	24	4,480	107,520	7	21	4,480	94,080	132	8	4,480	35,840	..	..	..	....	..	..	....
September M.....	24	4,335	104,040	7	21	4,335	91,035	132	8	4,335	34,680	..	..	..	....	..	..	....
October M.....	24	5,841	140,256	7	21	4,480	94,080	132	8	4,480	35,840	..	..	..	....	..	..	....
November M.....	24	5,655	135,720	7	21	4,335	91,035	132	8	4,335	34,680	..	..	..	....	..	..	....
,, S.	24	5,655	135,720	1 B	3	..	13,005	..	..	..	....	..	..	..	....	..	..	....
December M.....	24	5,844	140,256	7	21	4,480	94,080	132	8	4,480	35,840	..	..	..	....	..	..	....
		194,910	2,507,840				1,203,003				421,968				732,295			1,209,000

ing Working Expenses.

FROM KA'RWA'R.

	Salt.	General.	Timber.	Local.
	Tons.	Tons.	Tons.	Tons.
January...	930	310	775	310
February	1,120	420	280	280
March ...	2,325	744	558	620
April ...	3,900	1,440	540	300
May ...	1,860	1,705	1,798	930
June ...	.....	1,110	1,125	450
July ...	.....	.....	620	.....
August ...	.....	.....	620	.....
September	.....	.....	600	.....
October...	.....	930	465	155
November	.....	600	.....	150
December	.....	310	.....	.....
Total.....	10,135	7,569	7,381	3,195

SUMMARY.

Cotton	20,064
Salt	10,135
General	10,259
Timber	12,801
	53,529

			Tons.
To Kárwár exclusive of Local			28,174
From	do.	do.	25,085
Local	do.	do.	5,465

TO KA'RWA'R.

Goods Traffic.

General Goods.							Timber.							Local.							
Waggons.				Goods.			Waggons.				Goods.			Waggons.				Goods.			
No.	Tons.	Miles.	T. miles.	Tons.	Miles.	T. miles.	No.	Tons.	Miles.	T. miles.	Tons.	Miles.	T. miles.	No.	Tons.	Miles.	T. miles.	Tons.	Miles.	T. miles.	
6	15	4,480	67,200	30	4,480	134,400	7	17½	1,860	32,550	35	1,860	65,100	2	5½	1,860	9,300	10	1,860	18,600	
6	15	4,046	60,690	30	4,046	121,380	7	17½	1,680	29,400	35	1,860	58,800	2	5½	1,680	8,400	10	1,680	16,800	
..	..	....	....	..	....	....	..	..	....	....	..	....	....	..	..	....	....	..	....	....	
2	5	4,480	22,400	10	4,480	44,800	2	5	1,860	9,300	10	1,860	18,600	2	5	1,860	9,300	10	1,860	18,600	
..	..	....	....	..	....	....	..	..	....	....	..	....	....	..	..	....	....	..	....	....	
2	5	4,335	21,675	10	4,335	43,350	2	5	1,800	9,000	10	1,800	18,000	2	5	1,800	9,000	10	1,800	18,000	
..	..	..	....	..	..	....	..	..	..	....	..	..	....	..	..	..	....	..	..	....	
..	..	..	....	..	..	....	..	..	....	....	..	....	....	..	..	....	....	..	....	....	
..	..	..	....	..	..	....	4	10	1,860	18,600	20	1,860	37,200	2	5	1,860	9,300	10	1,860	18,600	
..	..	..	....	..	..	....	..	..	....	....	..	....	....	..	..	....	....	..	....	....	
..	..	..	....	..	..	....	2	5	900	4,500	10	900	9,000	2	5	900	4,500	10	900	9,000	
..	..	..	....	..	..	....	..	..	..	....	..	..	....	..	..	..	....	..	..	....	
..	..	..	....	..	..	....	..	..	....	....	..	....	....	..	..	....	....	..	....	....	
..	..	..	....	..	..	....	4	10	1,860	18,600	20	1,860	37,200	..	..	..	....	..	..	....	
..	..	..	....	..	..	....	4	10	1,860	18,600	20	1,860	37,200	..	..	..	....	..	..	....	
..	..	..	....	..	..	....	4	10	1,800	18,000	20	1,800	36,000	..	..	..	....	..	..	....	
..	..	..	....	..	..	....	..	..	..	....	..	..	....	1	2½	1,860	4,650	5	1,860	9,300	
..	..	..	....	..	..	....	..	..	..	....	..	..	....	1	2½	1,800	4,500	5	1,800	9,000	
..	..	..	....	..	..	....	..	..	..	....	..	..	....	2	5	1,800	9,000	10	1,800	18,000	
2	5	4,480	22,400	10	4,480	44,800	2	5	1,860	9,300	10	1,860	18,600	2	5	1,860	9,300	10	1,860	18,600	
			194,365			388,730				167,850			335,700				77,250			154,500	

TO GADDAK.

General.							Timber.							Local.							
2	5	4,480	22,400	10	4,480	44,800	5	12	1,860	23,250	25	1,860	46,500	2	5	1,860	9,300	10	1,860	18,600	
3	7½	4,046	30,346	75	4,046	60,690	2	5	1,680	8,400	10	1,680	16,800	2	5	1,680	8,400	10	1,680	16,800	
..	..	....	....	..	....	....	..	..	....	....	..	....	....	2	..	....	....	..	..	....	
20	50	4,480	224,000	15	4,480	67,200	2	5	4,480	22,400	8	1,860	14,880	..	..	1,860	....	..	..	....	
11	27½	4,480	123,200	9	4,480	40,320	2	5	1,860	9,300	10	1,860	18,600	4	10	....	18,600	20	1,860	37,200	
30	50	4,335	216,750	15	4,335	65,025	2	5	4,335	21,675	8	1,800	14,400	..	..	..	....	..	..	....	
10	25	4,335	108,375	19	4,335	82,365	2	5	1,800	9,000	10	1,800	18,000	2	5	1,860	9,000	10	1,800	18,000	
28	70	4,335	303,450	14	4,335	74,690	..	..	..	....	..	..	....	..	..	..	....	..	..	....	
20	50	4,480	224,000	15	4,480	67,200	2	5	4,480	22,400	8	1,860	14,880	..	..	..	....	..	..	....	
15	37½	4,480	168,000	40	4,480	179,200	5	12½	1,860	23,250	25	1,860	46,500	4	10	4,480	44,800	20	1,860	37,200	
21	52½	4,480	232,960	..	..	....	5	12½	4,480	56,000	25	1,860	46,500	2	5	1,860	9,300	10	1,860	18,600	
25	62½	2,167	135,437	34	2,167	73,678	5	12½	2,167	27,087	25	900	22,500	2	5	930	4,650	10	930	9,300	
27	67½	2,167	146,272	20	2,167	43,340	5	12½	2,167	27,087	25	900	22,500	2	5	2,167	10,835	10	900	9,000	
27	67½	2,167	146,372	20	2,167	43,340	5	12½	2,161	27,087	25	900	22,500	2	5	900	4,500	10	900	9,000	
..	..	..	....	..	..	....	4	10	1,860	18,600	20	1,860	37,200	..	..	..	....	..	..	....	
..	..	..	....	..	..	....	4	10	1,860	18,600	20	1,860	37,200	..	..	..	....	..	..	....	
..	..	..	....	..	..	....	4	10	1,800	18,000	20	1,800	36,000	..	..	..	....	..	..	....	
18	45	4,480	201,600	20	4,480	134,400	3	7½	4,480	33,600	15	1,860	27,900	1	2½	1,860	4,650	5	1,860	9,300	
21	52½	4,335	227,527	10	4,335	43,360	..	..	..	....	..	....	....	1	2½	1,860	4,500	5	1,800	9,000	
20	50	4,335	26,750	10	4,336	43,350	..	..	..	....	..	..	....	..	..	....	....	..	..	....	
21	52½	4,480	235,200	10	4,480	44,800	..	..	..	....	..	..	....	..	..	..	....	..	..	....	
			2,962,638			1,107,748				365,736			442,860				128,535			192,000	

(Signed) A. W. FORDE,
Member I. C. E.

Abstract of Estimate of Annual Revenue Account of the Kárwár Railway

EXPENDITURE.	Amount.	Per Cent. on Gross Receipts.	RECEIPTS.	Accounts.
	Rs.			Rs.
Maintenance of Way and Works	1,40,438	14·23	Coaching	2,90,000
Locomotive Expenses...	1,60,839	16·30	Goods Traffic	6,47,000
Carriage and Waggon	25,637	2·60	Sundries and Miscellaneous	50,000
Traffic Expenses	91,261	9·25		
General Charges	74,088	7·50		
Special and Miscellaneous	13,780	1·39		
Total Expenditure.....	5,06,043	51·27		
Balance Net profits for year.....	4,80,957	48·73		
	9,87,000	100·00		987,000

(Signed) R. A. SARGEAUNT, Lieutenant, R.E.,
Examiner Railway Accounts.

(2). *DATA for Calculating Working Expenses.*

Average Mileage...	FREIGHT TON MILEAGE.																TOTAL TON MILES.	
	UP.								DOWN.									
	Cotton.		Timber.		General.		Local.		Salt.		Timber.		General.		Local.		UP.	DOWN.
	Tons 90	Ton Miles.	Tons 100	Ton Miles.	Tons 125	Ton Miles.	Tons 50	Ton Miles.	Tons 125	Ton Miles.	Tons 100	Ton Miles.	Tons 125	Ton Miles.	Tons 50	Ton Miles.		
																	5,500	**7,000**
1. January and February.	2,500	2,25,000	1,300	1,30,000	1,100	1,37,500	600	30,000	2,000	2,50,000	2,600	2,60,000	1,800	2,25,000	600	30,000	5,22,500	7,65,000
																	13,100	**10,200**
2. March, April... ...	10,000	9,00,000	1,400	1,40,000	1,100	1,37,500	600	30,000	5,000	6,25,000	2,800	2,80,000	1,800	2,25,000	600	30,000	12,07,500	11,60,000
																	4,700	**5,600**
3 May, June	3,000	2,70,000	700	70,000	700	87,500	300	15,000	3,000	3,75,000	1,400	14,000	900	1,12,500	300	15,000	4,42,500	6,42,500
																	200	**250**
4. July, August.. ...	.....	.....	.....	.....	100	12,500	100	5,000	.....	.....	.....	.....	150	18,750	100	5,000	17,500	23,750
																	1,000	**450**
5. September, October ...	500	45,000	.....	.....	200	25,000	300	15,000	.....	.....	.....	.....	150	18,750	300	15,000	85,000	33,750
																	6,000	**3,000**
6 November, December.	4,000	3,60,000	600	60,000	800	1,00,000	600	30,000	.....	.....	1,200	1,20,000	1,200	1,50,000	600	30,000	5,50,000	3,00,000
Total.....	20,000	18,00,000	4,000	4,00,000	4,000	5,00,000	2,500	1,25,000	10,000	12,50,000	8,000	8,00,000	6,000	7,50,000	2,500	1,25,000	28,25,000	29,25,000
																	57,50,000	

The entire year has been divided into seasons of 2 months each, and the traffic has been apportioned to these seasons in accordance with ruling circumstances.

(Signed) R. A. SARGEAUNT, Lieutenant, R.E.,
Examiner Railway Accounts.

(3). VEHICLE MILEAGE.

The vehicles when loaded are assumed to carry an average freight of 4 tons. Allowing for empties in proportion to the preponderance of traffic in one direction, the mileage each season would be —

	382,500	
	603,750	
	321,250	
	11,875	
	42,500	
	275,000	
	1,636,875	
Add 10 per cent.	163,687	for additional empties, &c.
	1,800,562	
	140,000	Brake Vans.
	1,940,562	Total Vehicle Mileage.
	4½	Weight of Vehicles.
	7,762,248	
	970,281	
	8,732,529	Ton miles of vehicles.
	5,750,000	Ton miles of freight.
	14,482,529	

(4). TRAIN MILEAGE.

Assuming the maximum load of freight per train at 80 tons, then from Statement II. the train miles per season will be providing at least one train each way a day—

	Days.	Average No. both ways per diem.	Miles.	
1.	59	×3×	144	
2.	61	×4×	144	
3.	61	×2×	144	= 139,680.
4.	62	×2×	144	
5.	61	×2×	144	
6.	61	×3×	144	

or say 140,000 train miles.
2 Engines per each train on Ghauts.
Engine Mileage = 163,333.

(5). TON MILEAGE.

Engines	163,333	
	18	
	1,306,664	
	163,333	
	2,939,994	Engine ton miles.
	14,482,529	Vehicles and Freight.
	20,000	Passengers gross.
	15,000	Light running, &c.
	17,457,523	

or say 17,500,000 gross ton miles.

(6). DATA FOR WORKING EXPENSES.

*Gross ton mileage	17,500,000
Train Miles	140,000
Length of Line	144
Gross Receipts	987,000

*Miles of line × tons moved = mile tons.

(7). MAINTENANCE OF WAY AND WORKS.

		Rs.
Engineer's Salaries, &c. ...	... @ Rs. 180 per mile	25,920
Inspectors, &c.	„ 164...	23,596
Office Expenses	„ 70...	11,080
Permanant Way Wages ...	@ As. 10 per 1,000 ton miles	10,938
Do. Materials... ...	Pies116	10,584
Bridges and Tunnels... ...	Rs. 108 per mile	15,552
Miscellaneous, Fencing, &c.	„ 150	21,600
Stations and Buildings ...	„ 84	12,096
Staff Quarters	„ 18	2,592
Unclassified	„ 45	6,480
	Total...Rs.	1,40,438

(8). LOCOMOTIVE.

		Rs.
General Superintendent ...	Rs. 600 a month	72,000
Subordinate do. ...	„ 83 per mile	11,952
Office Expenses	„ 61	8,784
Driving, &c.	... As. 3 per Train mile...	26,250
Fuelling and Cleaning ...	„ 0·5	4,375
Fuel (*see* note below*) ...	... ...	17,808
Water...	... Pies 25per 1,000 ton miles ...	2,279
Oil, Tallow, &c....	„ 25	2,279
Repairs, Wages	„ 100	9,115
Do. Materials	„ 50	4,557
Unclassified	Rs. 10 per mile	1,440
	Total...Rs.	1,60,839

CARRIAGE AND WAGGON.

		Rs.
General Superintendent ...	Rs. 400 a month	4,800
Subordinate do. ...	„ 25 per mile	3,600
Office	„ 20	2,880
Repairs, Wages	... Pies 46 per 1,000 ton miles ...	4,193
Do. Materials	„ 70	6,380
Cleaning and Oiling	„ 14	1,276
Do. Stores...	„ 15	1,356
Unclassified	Rs. 8 per mile	1,152
	Total...Rs.	25,637

(9). TRAFFIC DEPARTMENT.

		Rs.
General Superintendent, &c....	... Rs. 160 per mile	23,040
Station Staff (*see* note below†)	... ...	25,000
Train Staff	... As. 1 per Train mile ...	8,750
Fuel, Lighting, &c.	... Rs. 118 per mile	16,992
Waggon cover, &c.	... As. 0·5 per 1,000 ton miles	4,375
Clothing	... Rs. 20 per mile	2,880
Printing, Stationery, &c. ...	... „ 58	8,352
Miscellaneous	... „ 3	432
Unclassified	... „ 10	1,440
	Total...Rs.	91,261

*Consumption 19 lbs. coal per ton mile—1 ton coal =3 tons wood at 4 Rs. equivalent to coal at Rs. 12 a ton.
† Station Staff per 1,000 mile tons, on B. B. and C. I. Railway=Rs. 3.

(10). GENERAL CHARGES.

		Rs.
General Superintendent, &c....	... Rs. 210 per mile ...	... 30,240
Police	„ 140	... 20,160
Advertizing	„ 4·5	... 648
Telegraph	„ 150	... 21,600
Unclassified	„ 10	... 1,440
	Total...Rs.	74,088

SPECIAL AND MISCELLANEOUS.

		Rs.
Law	Pies 2 per 1,000 ton miles	
Compensation	„ 6	180
Special Funds	Rs. 90 per mile...	640
	... ...	12,960
	Total...Rs.	13,780

Statements 7 to 10 inclusive have been based on figures derived from a consideration of the cost under each separate head per 1,000 ton miles per mile of open line, and per train mile on the East Indian, Great Indian Peninsula, B. B. and C. I., Sind, and Great Southern of India, Railways, for the year 1871, according to the published Revenue Accounts taking into consideration as far as possible, the figures of the Kárwár Railway which will distinguish it from any or all of the above.

(Signed) R. A. SARGEAUNT, Lieutenant, R.E.,
Examiner, Railway Accounts,

To

THE PRESIDENT, KARWAR RAILWAY COMMITTEE.

SIR,

I have the honour to submit an estimate prepared at my request by Lieut. Sargeaunt, R.E., Examiner Railway Accounts, of the probable expense of working over the Kárwár Line the quantity of traffic assumed by the Committee as a basis for calculation in their questions to Messrs. Forde and LeMesurier on the same subject.

I also submit Comparative Statements of Cost, Revenue, and Working Expenses of all Indian Railways during 1871 prepared by the Secretary to the London Board of the B. B. and C. I. Railway Company.

(Signed) H. F. HANCOCK, Lieut.-Colonel, R.E.,
Acting Consulting Engineer for Railways.

COMPARATIVE STATEMENT

OF

COST, REVENUE AND WORKING EXPENSES OF INDIAN RAILWAYS

FOR 1871.

INDIAN

COMPARATIVE STATEMENT of Construction Cost, Open and Train Mileage Receipts Guaranteed and State Indian

	RAILWAY.	Open Mileage.	CONSTRUCTION COST. Capital spent to 31st Dec. 1872, exclusive of Stores in hand.	CONSTRUCTION COST. Per Mile.	No. of Trains.	Train Miles.	Per Open Mile. No. of Trains.	Per Open Mile. Train Miles.	Engines Employed. No.	Engines Employed. Trian Miles per Engine.	Engines Employed. Earnings per Engine.
			£	£							£
Guaranteed.	1 East Indian Railway ...	1,505	29,334,557	19,491	35,966	5,200,082	24	3,461	440	11,827	5,611
Guaranteed.	2 Great Indian Peninsula Railway	1,274	21,496,276	16,873	45,158	4,236,255	35½	3,325	251	16,877	7,394
Guaranteed.	3 Madras Railway	832	9,436,050	11,341	11,690	1,692,772	14	2,035	119	14,225	4,615
Guaranteed.	4 Bombay, Baroda and Central India Railway	*350	6,930,644	† 18,731	15,729	894,936¾	45	2,557	55	16,272	9,122
Guaranteed.	5 Scinde, Punjaub and Delhi Railway	667½	9,207,636	13,794	7,902	1,214,957	12	1,820	79	15,379	4,923
Guaranteed.	6 Great Southern of India Railway	168	1,410,793	8,398	2,635	252,265	16	1,502	21	12,012	3,397
Guaranteed.	7 Eastern Bengal Railway ...	156½	2,734,949	17,475	6,103	432,707	39	2,765	43	10,063	4,686
Guaranteed.	8 Oude and Rohilkund Railway	42	2,267,451	‡ 11,337	869	43,143	20½	1,027	9	4,794	2,846
Guaranteed.	9 Carnatic Railway.....	19	75,937	3,997	1,483	28,077	78	1,483	4	7,044	890
State.	10 Calcutta and South Eastern Railway	28	643,685,	22,989	1,863	40,736	67	1,455	8	5,092	993
State.	11 Khangaum Railway.....	8	46,823	5,853	1,104	8,830	138	1,104	...	.....	...
State.	12 Nulhatee Railway	27	30,000	1,111	741	21,056	27	780	4	5,264	1,947
State.	13 Oomrawattee Railway.....	6	44,103	7,350	858	5,148	143	858	...	.....	...
	Totals and Average.....	5,083	83,658,904	15,902	131,360	14,080,064¾	26	2,770	1,033	13,630	5,891
	Indus Steam Flotilla	.....	.....	.....	.....	.....	...	...	...	.....	...
	Railways in the United Kingdum, 1870	15,537½	529,908,623	34,106	.....	169,067,372	...	10,881	9,379	18,026	4,806

* 15¼ Miles opened 24th May 1971 ; 22 Miles opened 30th November 1871.

WORKING

	RAILWAY.	Open Mileage.	Maintenance. Amount.	Maintenance. Per Cent of Gross Receipts.	Maintenance. Per Open Mile.	Maintenance. Per Train Mile.	Locomotive. Amount.	Locomotive. Per Cent of Gross Receipts.	Locomotive. Per Open Mile.	Locomotive. Per Train Mile.	Repairs and Renewals of Carriages and Wagons. Amount.	Repairs and Renewals of Carriages and Wagons. Per Cent of Gross Receipts.	Repairs and Renewals of Carriages and Wagons. Per Open Mile.	Repairs and Renewals of Carriages and Wagons. Per Train Mile.
			£		£	d.	£		£	d.	£		£	d.
Guaranteed.	1 East Indian Railway...	1,505	211,129	8·55	140	9·73	341,573	13·85	227	15·74	98,536	3·99	65	4·54
Guaranteed.	2 Great Indian Peninsula Railway.....	1,274	194,999	10·51	153	11·04	398,171	21·45	313	22·55	119,454	6·44	94	6·76
Guaranteed.	3 Madras Railway.....	832	88,875	16·18	107	12·60	105,951	19·29	127	15·02	15,832	2·88	19	2·24
Guaranteed.	4 Bombay. Baroda and Central India Railway.	350	† 77,739	15·49	222	20·90	91,997	18·33	263	24·73	27,031	5·39	77	7·26
Guaranteed.	6 Scinde, Punjaub and Delhi Railway	667½	100,567	25·90	151	19·86	116,424	29·98	175	23·00	25,942	6·68	39	5·12
Guaranteed.	6 Great Southern of India Railway	168	9,222	12·93	55	8·77	14,734	20·65	88	14·02	3,053	4·28	18	2·90
Guaranteed.	7 Eastern Bengal Railway.	156½	26,432	13·12	169	14·66	30,352	15·06	194	16·83	5,341	2·65	34	2·96
Guaranteed.	8 Oude and Rohilkund Railway	42	5,875	22·94	140	32·68	4,407	17·20	105	24·51	599	2·34	14	3·33
Guaranteed.	9 Carnatic Railway	19	452	12·70	24	3·85	632	17·75	33	5·38	63	1.77	3	·54
State.	10 Calcutta and South Eastern Railway	28	1,716	21·60	61	10·11	2,928	36·85	104	17·26	246	3·09	9	·35
State.	11 Khangaum. Railway ...	8	651	30·49	82	17·64	773	36·21	97	20·97	234	10·96	29	6·35
State.	12 Nulhatee Railway	27	762	9·78	28	8·69	1,354	17·39	50	15·43	768	9·86	29	8·75
State.	13 Oomrawattee Railway.	6	.....	...	...	..	458	26·19	76	21·28	140	8·00	23	6·51
	Totals and Averages ...	5,083	718,419	11·80	141	12·24	109,754	18·23	218	18·91	297,239	4·88	59	5·07
	Indus Steam Flotilla	.....	.....	...	...	...	.....	...	...	.....	.....	.....	...	....
	Railways in the United Kingdom, 1870	15,537½	4,155,367	9·22	267	5·90	5,619,649	12·46	362	7·98	1,857,232	4·12	119	2·64

* Under the head "Miscellaneous" are included heavy payments for Indian Income Tax, Fire Insurance, and in the cases of the G. I. P. and the B. B. and C. I. Railways, considerable amounts for Expenses of Collection and Delivery of Goods, which, in the case of the English Railways, are deducted from the Gross Receipts for Merchandise, and therefore do not form part of their Working Cost.

BOMBAY, BARODA AND CENTRAL INDIA RAILWAY,
OFFICES: 45, *Finsbury Circus, E. C.*

RAILWAYS.

from all Sources, Working Charges and Net Earnings per Open and Train Mile of the Railways, for the Year 1871.

Passengers Conveyed.		Merchandise and Minerals Conveyed.		GROSS RECEIPTS.				Receipts per Open Mile.				Receipts per Train Mile.			
Total Number.	Per Open Mile.	Total Tons.	Per Open Mile.	From Passenger Traffic.	From Goods Traffic.	Miscellaneous.	Total	Passenger.	Goods.	Miscellaneous	Total.	Passenger.	Goods.	Miscellaneous	Total.
				£	£	£	£	£	£	£	£	s.	s.	s.	s.
5,439,220	3,614	1,129,674	751	742,032	1,639,417	87,426	2,468,875	493	1,089	58	1,640	2·84	6·30	·34	9.48
3,463,604	2,719	1,062,918	834	462,584	1,360,373	33,022	1,855,979	363	1,068	26	1,457	2·19	6·42	·15	8·76
2,302,852	2,767	326,933	393	202,851	325,891	20,383	549,125	244	392	24	660	2·40	3·85	·24	6·49
2,605,750	7,445	269,259	769	187,531	298,042	16,219	501,792	536	852	46	1,434	66	7·40	·40	11·21
1,975,452	2,959	221,246	331	189,335	186,726	12,229	388,290	283	280	18	581	3·11	08	·20	6·39
813,885	4,844	91,393	544	41,332	28,194	1,817	71,343	246	168	11	425	3·27	2·24	·14	5·65
1,376,880½	8,798	177,322	1,133	81,617	113,284	6,611	201,512	522	724	42	1,288	3.77	5·24	·30	9·31
327,983½	7,809	47,682	1,135	15,013	9,749	852	25,614	368	232	20	610	6·96	4.52	·39	11·87
91,065	4,793	1,548	81	3,282	256	21	3,560	173	14	1	188	2·33	·18	·01	2·52
345,947½	12,355	22,336	798	5,090	1,884	971	7,945	182	67	35	284	2·50	·92	·48	3·90
19,066	2,383	24,115	3,014	35	1,769	9	2,136	45	221	1	267	·81	4·00	·02	4·83
72,226½	2,675	8,338	309	4,926	2,158	704	7,788	182	80	26	288	4·68	2·05	·66	7·30
30,973	5,162	22,689	3,781	439	1,303	8	1,750	73	217	1	291	1·70	5·06	·03	6·79
18,934,461	3,726	34,05,429	670	1,936,390	3.969 047	180,272	6,085,709	381	780	35	1,196	2·75	5·64	·26	8·65
6,124	...	21,849	...	4,159	56,262	.....	60,421	...	...	...	...	...	...	...	...
18,940,585	3,726	34,27,278	670	1,940,549	4,025,309	180,272	6,146,130								
330,004,398	21,230	.....	...	19,301,911	24,115,159	1,631,073	45,078,143	1,242	1,552	105	2,899	2·28	2·85	·19	5·32

† Calculated on 370 miles, 40 additional miles having been opened in May 1872.
‡ Calculated on 200 miles, nearly double that number being under construction, and 120 miles open in 1872.

CHARGES.

Traffic.				Miscellaneous.*				Total Working Cost.				NET EARNINGS.		
Amount.	Per Cent of Gross Receipts.	Per Open Mile.	Per Train Mile.	Amount.	Per Cent of Gross Receipts.	Per Open Mile.	Per Train Mile.	Amount.	Per Cent of Gross Receipts.	Per Open Mile.	Per Train Mile.	Amount.	Per Open Mile.	Per Train Mile.
£		£	d.	£		£	d.	£		£	£	£	£	s.
249,004	10·08	166	11·47	188,253	7·62	125	8·67	1,088,495	44·09	723	4·18	1,380,380	917	5·30
221,312	11·92	173	12·51	78,155	4·21	61	4·42	1,012,091	54·53	794	4·78	843,888	663	3·98
49,953	9·09	60	7·08	20,906	3·81	25	2·96	281,517	51·25	338	3·32	267,608	322	3·17
62,386	12·43	179	16·76	40,328	8·04	115	10·84	299,481	59·68	856	6·70	202,311	578	4·51
69,134	17·81	102	13·64	71,816	18·49	108	14·18	383,883	98·86	575	6·31	4,407	6⅔	·08
6,223	8·72	37	5·95	6,134	8·60	36	5·84	39,366	55·18	234	3·12	31,977	191	2·53
32,521	16·13	208	18·02	17,304	8·59	111	9·59	111,950	55·55	716	5·17	89,562	572	4·14
3,908	15·26	93	21·73	2,965	11·57	71	16·49	17,754	69·31	423	8·23	7,860	187	3·64
297	8·34	16	2·53	867	24·35	46	7·38	2,311	64·91	122	1·64	1,249	66	·8[illegible]
1,848	23·26	66	10·90	912	11·48	33	5·40	7,650	96·28	273	3·75	295	11	·1[illegible]
243	11·38	30	6·60	.....	.....	...	...	1,901	89·04	238	4·29	235	29	·54
1,191	15·29	44	13·58	446	5·73	16	5·08	4,521	58·05	167	4·29	3,267	121	3·10
207	11·84	35	9·58	.....	.....	...	...	805	46·03	134	3·12	945	157	3·67
698,227	11·49	137	11·90	428,086	7·30	84	7·03	2,251,725	53·43	639	4·62	2,833,984	557	4·03
.....	...	...	...	.....	.....	...	...	50,325	83·29	...	...	10,096	...	...
								3,302,050	53·72			2,844,080		
6,087,371	13·54	392	8·64	3,995,906	8·82	257	5·67	21,715,525	48·16	1,397	2·57	23,362,618	1,504	2·76

In this amount is included £ 15,431 for Special Bridge Repairs and Additions rendered necessary by the Monsoon flood damages of 1871.

MEMORANDUM.—Most of the above figures are based on the Returns given in the recently published Report on Indian Railways for 1871-72, by JULAND DANVERS ESQ, the Government Director of the Indian Railway Companies.

J. A. BAYNES.

00110186

Digitized with financial assistance from

H T Parekh
FOUNDATION

An Initiative by
HDFC
WITH YOU, RIGHT THROUGH

on 27 November, 2018